Master thesis for the Master of Philosophy in Economics degree

The effect of openness on welfare state generosity

- an empirical analysis of 18 OECD-countries 1970-2000

Nina Lillelien

November 17th, 2008

Department of Economics

University of Oslo

Preface

I wish to thank my supervisor at the Department of Economics, Jon H. Fiva, whose enthusiasm and support, constructive feedback and generosity in sharing ideas and thoughts have been great motivation factors throughout the writing process.

I am also very thankful for the student stipend I was granted by the Norwegian Centre of Excellence "Equality, Organization, and Social Performance" (ESOP) for writing this thesis.

Research fellow Torfinn Harding at the University of Oxford has provided me with data on foreign direct investment, and Ismael Sanz at the Universidad Complutense de Madrid has generously shared his data on government expenditure with me. This has benefited my analysis to a great extent.

In addition, I would like to thank Linn for proof-reading and Kristine and Daniel for help with LaTeX.

Naturally, the responsibility for any mistakes or flaws in this thesis is mine and mine alone.

Oslo, November 17th 2008

Nina Lillelien

Contents

1 Abstract **1**

2 Introduction **2**

3 Welfare states - an overview **4**
3.1 A very short history 4
3.2 What is a welfare state? 5
3.3 Recent development in public spending 6
3.4 What determines welfare state generosity? 8

4 Theory **9**
4.1 Compensation versus efficiency 9
4.1.1 The Compensation Hypothesis 9
4.1.2 The Efficiency Hypothesis 10
4.2 Tax competition and public spending 10

5 Literature Review **15**
5.1 Empirical strategies 15
5.2 Evidence of tax competition 15
5.3 Openness and welfare state generosity 17

6 Empirical strategy **21**
6.1 Estimation with panel data 21
6.1.1 Fixed versus random effects 23
6.2 How to analyse welfare state generosity - the dependent variable problem 23
6.2.1 Examining welfare programmes - the volume perspective 24
6.2.2 Examining welfare programmes - the inequality perspective 25
6.2.3 Examining welfare programmes - the institutional perspective . . 26

7 Data **28**
7.1 Dependent variables 28
7.2 The Independent Variable Problem 29
7.3 Control variables 32
7.3.1 Demographic variables 32
7.3.2 Macroeconomic variables 32
7.3.3 Political variables 33

8 Results **35**
8.1 Pooled OLS-results 35
8.2 Fixed effects-analyis 35
8.2.1 Effect of control variables 39
8.3 Sensitivity analyses 40
8.3.1 Testing for effects of business-cycle fluctuations 40
8.3.2 Impact of FDI and the KOF-index 42
8.3.3 Endogeneity issues 46
8.3.4 Omitting possibly endogenous control variables 47

9 Concluding remarks **48**

References **50**

Appendices **57**

A Details of the KOF-index **57**

B Regressions from sensitivity analyses **58**

1 Abstract

This thesis investigates the impact of economic integration, or openness, on welfare state generosity. I provide an overview of the development of Western welfare states and describe two competing hypotheses on how national governments react to openness in terms of welfare provision. The *compensation* hypothesis states that increased openness means higher risk for citizens and thus a demand for higher welfare state generosity, the focus of the *efficiency* hypothesis is that both welfare migration and the assumption that countries will have to alter of tax rates in order to attract mobile tax bases both will put downward pressure on welfare generosity.

The contribution of this thesis is empirical. To motivate the empirical exercise, I present a simple theory for how increased economic integration affects welfare states through tax competition. I also discuss different ways of defining welfare state generosity and how to choose the measure that captures the essential characteristics of the welfare system, while at the same time being easy to compare among countries in empirical research.

Earlier studies have found conflicting evidence on the subject. There might be several reasons for this: particularly, the results may depend on the choice of welfare measure, the explanatory variable or choice of econometric method.

Here, using Stata 9.0, the effect of economic integration is estimated utilizing international trade as proxy for openness on several welfare variables for an unbalanced panel of 18 OECD-countries over the years 1970-2000. I conduct the analysis by using fixed effects regression and find evidence in favor of the efficiency hypothesis. This result is robust to several sensitivity analyses.

2 Introduction

The Welfare State systems in Western countries have been subject to both praise and criticism since they started to evolve rapidly after World War II. Development of social security nets and a substantial growth in the public sector is not an obvious political consensus, but apart from mere value judgments about the state's role in providing social security, other aspects of the conditions for welfare states have been much debated over the past years as well. What really determines welfare state generosity has been much analyzed - in terms of political, economic and demographical factors as well as established institutions.

In this thesis, I focus on one aspect that has been discussed at great length, namely economic integration, or *openness*[1]. For all OECD-countries, both international trade and foreign direct investment have increased over the last decades. There is a contrast between governments shaping institutions for international trade, investment and integration of financial markets on one hand and coping with the consequences of economic integration on the other. The growth in openness has thus given grounds for a substantial discussion regarding the relationship between economic integration and domestic politics. A higher degree of integration of national economies creates possibilities for spillover-effects when countries decide on policies unilaterally. Whereas traditionally, tax schemes and how to finance public spending have been mainly domestic issues; now, by increased trade and flows of capital between countries, decisions one country makes will have larger implications for other economies. In addition, more integrated markets imply higher exposure to external shocks for the citizens.

What are the effects of more market integration markets and higher mobility of tax bases? There are two main frameworks used for trying to answer this question:

The *efficiency hypothesis* claims that economic integration undermines governments' sovereignty in domestic matters and leads them to alter tax rates and cut back on social transfers. The *compensation hypothesis*, on the other hand, focuses on the increased demand for social security following deeper integration of markets, as this exposes the citizens to external shocks. Hence welfare state generosity, according to this hypothesis, should be increased to compensate for this risk.

Previous studies find conflicting evidence on the effect of openness on welfare state generosity - both positive effect, negative effect and no effect have been advocated.

One much cited example is Rodrik (1998), who finds that international trade increases government spending and social spending. This result is reached by Ordinary

[1] I will use the two terms interchangeably.

Least Squares analysis on a 3-year average of observations of a large sample of countries. Other analyses use other conceptualizations of welfare state generosity, other proxies for openness and other empirical methods - thus there are several potential reasons for the differences in outcomes.

The problem of measuring welfare state generosity is the basis for the second aspect of this thesis, which is a more methodological issue. How should welfare states be conceptualized? By the volume of social spending in a country? By a particular benefit, e.g. pensions? What are we really comparing when we contrast one welfare state system with another?

This thesis is aiming at joining the debates on the effect of openness on welfare states and on how to conceptualize welfare state generosity. I do this by evaluating the effect of economic integration on several dependent variables that have been used as measures for welfare state generosity in previous research, and compare the outcomes for the different variables. I will seek to get a clearer answer to the question of the effects of openness by using a wider spectrum of welfare variables. An empirical analysis of 18 OECD-countries from 1970-2000 is provided, estimating the effect of openness on different welfare measures by fixed effect analysis.

I use welfare measures belonging to three different perspectives on how welfare state generosity should be conceptualized: the volume perspective, which measures social spending, the inequality perspective, which measures the distribution of disposable income, and finally the institutional perspective, which measures social entitlements.

Using international trade as explanatory variable, I find that openness *decreases* welfare state generosity. This results remain robust through several sensitivity analyses: testing for business cycle effects, conducting the analyses with other proxies for openness, omitting possible endogenous control variables from the analysis and lagging explanatory variables to avoid reverse causality does not alter my main conclusion.

The thesis is organized as follows: Section 3 provides an overview of the development of Western welfare states, both in a historical perspective and for recent years, and also discusses how to define a welfare state system. Section 4 describes the two hypotheses for effects of economic integration on welfare state generosity (efficiency and compensation) in further detail and provides a theoretical background for the effect of openness on public spending through tax competition. Section 5 summarizes literature on both openness and tax competition and on openness and welfare state generosity. Section 6 describes the econometric method I choose for the analysis and discusses choices of different dependent variables in welfare state research. Section 7 describes the data used. In section 8, the results from the analysis are presented, and section 9 concludes.

3 Welfare states - an overview

3.1 A very short history

A welfare state is a relatively new phenomenon in the history of social protection.

From the 16th century on, "poor laws" under an absolutist state constituted the social security net in European countries. With low benefits and a high degree of social stigma for its users, the target group of this form of social insurance was only those who could not by any means participate in the market - an insurance design made to maximize labor market performance (Esping-Andersen, 1990, page 22). It was not until the 19th century the foundations for the Western welfare schemes we know today were laid, during a period of liberal democracy and restricted suffrage and when the new social challenges occurring in the aftermath of industrialization coincided with new thoughts on social insurance. Finally, in the 1880's, the modern welfare state began to emerge (Flora and Alber, 1981, page 28). Flora and Heidenheimer (1981) argue that the development of western welfare states is to be viewed as a part of the modernization process. The two main forces behind welfare state development were increasing inequality and differentiation on one hand and the dissolvment of old societal structures on the other. Industrialization, and with it, urbanization, created new needs for social protection, and the movement towards universal suffrage brought the political power to make changes in policies and institutions. Despite much variation in welfare schemes among European countries, there was a common trend from the last decades of the 19th century until the World War I that welfare policies were set by the elites. This changed in the 1920's, when social democratic forces came to work and the impact of these started to shape the social insurance schemes.

This development however, was just the beginning - it was not until the era of economic growth in the years after World War II the development gained speed. Social insurance started to cover a broader base of inhabitants and a larger number of risks, and existing benefits were improved (Clasen, 1997, page 2), until it finally became the welfare systems of today. The welfare states expanded, both in mere pecuniar terms and in the quantity of insurance programmes:

In Sweden, Germany and United Kingdom, the share of public expenditure in GDP tripled from 1900 until the end of World War II, and the main reason for this increase was social expenditures[2]. In Sweden, these expenditures' share of the governmental budget in this time period increased from 30% to 57%, in Germany from 30% to 62% and in UK from 20% to 47% (Flora and Alber, 1981, page 50). Equivalent numbers for the three countries in 2003 were 53.8% for Sweden, 56.3% for Germany and 48.4% for the UK[3]

[2]Expenditures on education, housing, health and social insurance and assistance

[3]Expenditures on pensions, cash benefits, sick leave, unemployment services and pay, labor market

(OECD.Stat: Social Expenditure - Aggregated data, 2008).

Overall, the existence of the social insurance programmes pensions, sick benefits, work accident insurance and unemployment insurance differed a lot between OECD-countries in the 1930's. Work accident insurance was the first to be widely employed, whereas unemployed insurance was much more rare at this stage. In the 1950's however, only sickness insurance was still lacking in some countries, and in 1995, out of 18 OECD countries[4], the only country lacking one of these programmes was the USA - which still did not have a national sickness benefit programme (Montanari, 2001, page 474-475).

3.2 What is a welfare state?

In the 20th century, welfare state institutions thus developed substantially in North-America and Western European countries. Although the same classifications of social insurance programmes were implemented, the political motives behind the programmes, the degree of universal benefits versus means-testing, the degree of overall redistribution and consequently the *ambitions* of the insurance schemes differed from country to country and over time within countries. In the light of this, a classification of different groups of welfare states will necessarily be very stylized. Nevertheless, several attempts to group welfare states according to characteristics have been made. Such attempts focus on what entitlements citizens have in means of social security benefits.

Titmuss (1958) makes a distinction between *residual* and *universal* welfare states: the former resembles the aforementioned poor laws in the way that it provides social insurance only when other ways of insurance (the market, or family/social networks) have failed, and targets only certain groups. The universal welfare states provide, as their name suggests, insurance to the population as a whole, and welfare provision is embodied in state institutions.

A more detailed classification of different types of welfare states is found is Esping-Andersens classic "The Three Worlds of Welfare Capitalism", in which he argues that the granting of social rights and how the state, the family and the market interact when it comes to provision of social insurance must be considered when classifying welfare systems . De-commodification, or when "a (social) service is rendered as a matter of right, and when a person can maintain a livelihood without reliance on the market" (Esping-Andersen, 1990, page 22) lies at the core of the classification-question. What characterizes a welfare state is thus its' institutional commitment to welfare provision - what kind of rights a citizen has when he/she finds it necessary to not be a part

training a.o., education excluded

[4]Australia, Austria, Belgium, Canada, Denmark, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom and USA

of the labor market - meaning unemployment insurance, sickness insurance, pensions, maternity leave et cetera. The selection of Sweden, Germany and United Kingdom are the prime examples of the threefold typology of welfare systems: the Scandinavian (most de-commodifying), the Conservative welfare state, and the Liberal welfare state (the least de-commodifying), respectively.

The concept of decommodification will be described in further detail in chapters 6.2 and 7.1.

3.3 Recent development in public spending

Another aspect of welfare state development, of course correlated with the development of entitlements, is the volume of public (and social) spending. From 1950 and well into the 1990's, there has been a positive growth in such spending. Now, there are some signs that could suggest that this growth has been somewhat restrained over the last years - as figure 1 shows [5]. The figure displays public expenditure on social protection as percentage of GDP for the Germany, Sweden and United Kingdom.

From the figure, it is clear that there has been a positive trend in social expenditure since 1970, but the development might also indicate that this positive trend is declining. Shcuknecht and Tanzi (2005) evaluate government expenditure from 1982 to 2000 and argue that there has been an inverse U - pattern in public spending. In their selection of 22 countries, most saw a growth in public spending until somewhere in the early 1990's and from then on there was a decline. Moreover, reduction in transfers and subsidies constituted half of this decline, although by how much the growth in public spending has changed differ quite a lot from country to country.

Figure 2[6] shows the development in the index of decommodification for the same countries as above. Clearly, the fluctuations, if any, for this index are quite different than for social protection expenditure. Although for Sweden, there seems to be an inverse U - pattern in decommodification, for Germany the index seems constant, and for the United Kingdom the index has increased slowly over the 30-year period.

The result that fluctuations in expenditure on social protection and an index of social entitlements are so different, comes as no surprise - as decommodification sums up social rights legislations, this will necessarily change at a slower pace and be subject to less immediate influence from demographic, political and macroeconomic factors. That the index for Sweden is so volatile is perhaps more striking than the stable pattern for Germany.

[5]Source: Sanz and Velázquez (2007)

[6]Source: Scruggs and Allan (2006) - the welfare state generosity index

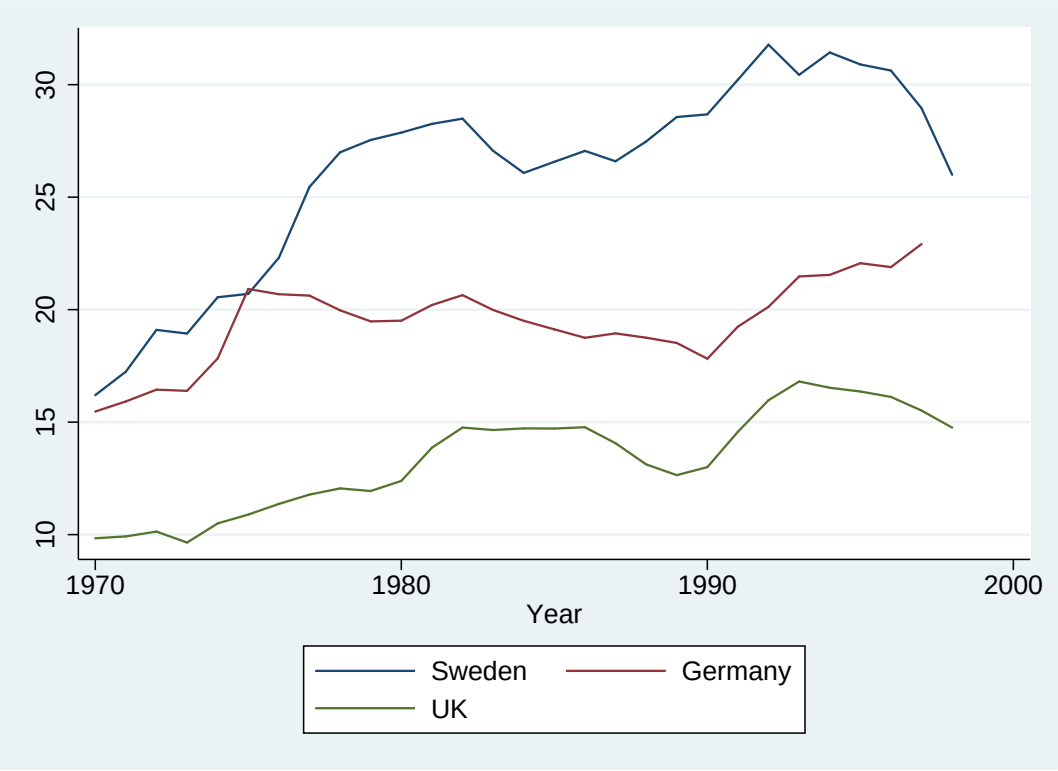


Figure 1: Social protection expenditure - percentage of GDP

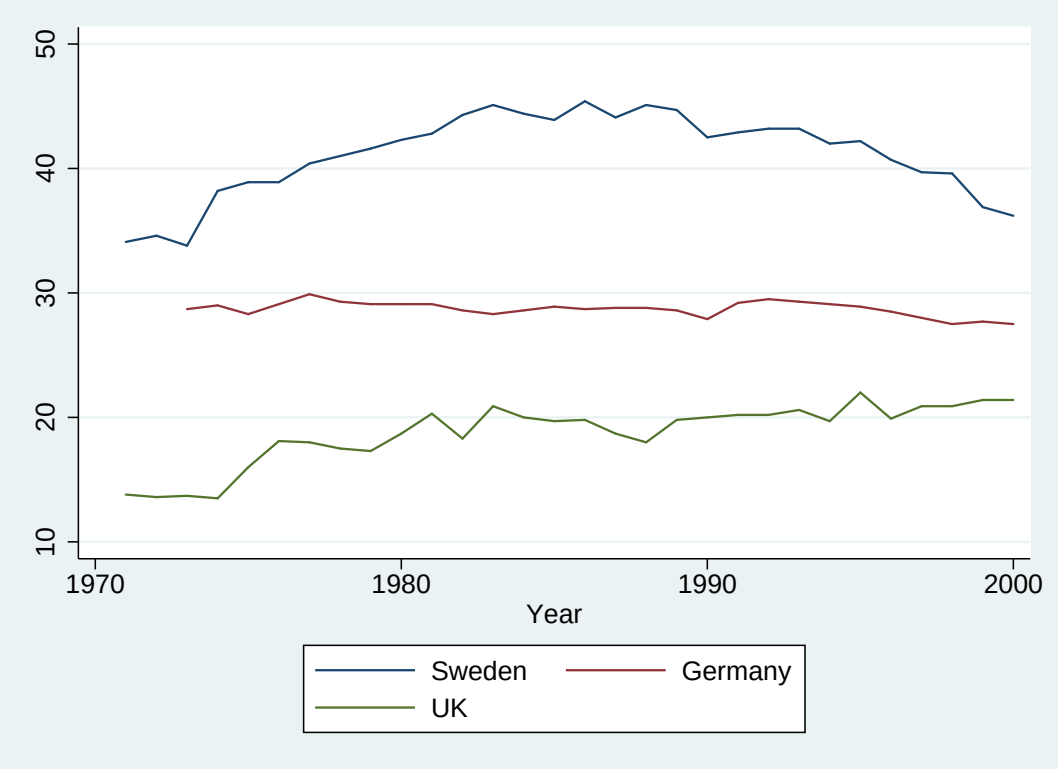


Figure 2: Decommodification index

3.4 What determines welfare state generosity?

We have seen that in the decades after World War II, public and social spending increased, regardless of type of welfare state. There is a broad consensus that up until 1975-1980, welfare states expanded. Regarding the years after 1980 however, there has been a wide debate on in what direction Western welfare states are moving. Are they still expanding? Are they scaled down? Or is nothing happening at all?

That this is such a difficult question to answer, is of course interesting in itself. But at the core of this debate is the issue of what really determines welfare state generosity - and this question can of course be applied to both social spending and welfare state institutions.

For example, the "Power Resources"-approach (Korpi and Palme, 1998) focuses on the welfare state as an arena for distributional conflicts between socioeconomic groups. In such conflicts, partisan politics will play a significant role . Another approach, formulated by Pierson (1996), focuses on path dependency in welfare state institutions, arguing that due to persistent institutions, welfare states remains more or less the same even when the political or economical climate changes.

Yet another much debated topic is the link between economic integration and welfare states. While welfare states have expanded since World War II, so have international trade and capital flows. Higher integration of markets create possibilities for spillover-effects of government policies, and in addition, citizens are exposed to higher risk. Two competing hypotheses for in which direction the influence from openness to welfare state generosity goes, and the theory behind these arguments are elaborated on in the next section.

4 Theory

4.1 Compensation versus efficiency

When it comes to welfare state generosity, how do national governments respond to increased openness? This matter is by no means settled. Two different hypotheses on the subject can be distinguished:

- The *Efficiency Hypothesis* states that as openness causes both welfare migration as well as competition for mobile tax bases and goods between countries, this drives tax revenues downwards. This, in turn, restrains welfare state generosity.
- The *Compensation Hypothesis*, on the other hand, focuses on the political incentives to expand welfare spending to insure the inhabitants against the risks that follows with a more open economy.

4.1.1 The Compensation Hypothesis

As we have seen, both social spending and openness have increased since 1970. Does this mean that openness does not threaten the welfare state? Two types of arguments could substantiate this (Koster, 2008):

First, economic openness causes insecurity: with more integrated markets the citizens of a country are more vulnerable to external shocks, which may cause unemployment - and hence a broad social security net is needed. Rodrik (1998) claims that economies that are more open to international trade are more vulnerable to external shocks. Based on the Stolper-Samuelson theorem[7], we can say that if trade in labour-intensive goods with less developed countries, which are labour abundant, reduces prices on these goods, then the real wages of low-skilled workers in the developed countries will decrease - both in absolute terms and relative to other workers (Krugman, 2008). In Garrett and Mitchell (2001) the argument is expanded to also include risk from globalization of finance. This process, they claim, benefits mostly people in the finance sector and not people in general. In addition, financial globalization can also create unexpected volatility in market conditions - for which the events in the financial markets in autumn 2008 may serve as a good example. These factors contribute to increased economic insecurity as well as economic inequality, and will thus enhance political support for social security provision.

[7]The theorem says that given two factors of production, constant returns to scale and perfect competition, a rise in the relative price of a good that uses one input factor more intensively, this will increase the return to this input factor. The return to the other input factor will decrease (Stolper and Samuelson, 1941). Krugman (2000) points out that an increase in trade with less developed countries has coincided with a fall in real wages for low-skilled American workers. He also states that although it is natural to suspect a link between these two facts, the effect of trade on wages is most likely limited.

Second, to strengthen the ability to compete in the world market, governments need to invest in the welfare state to create social stability and increase human capital.

4.1.2 The Efficiency Hypothesis

As stated in chapter 2, it seems that growth rates in social spending have for some countries been zero or negative in the last part of the 1990's, after decades of positive growth. Could this mean that openness restrains welfare states, rater than expanding them?

The potential negative effect of openness on welfare policy goes through the link of tax legislation and *tax competition*. Wilson and Wildasin (2004) define tax competition as "non-cooperative tax setting by independent governments, under which each government's policy choices influence the allocation of a mobile tax base among "regions" represented by these governments" (Wilson and Wildasin, 2004, page 1067). E.g. barriers to international trade are lowered and transportation becomes easier and less costly with increased economic integration, and consequently relocating business from one jurisdictions to another will be easier Sinn (2003, page 3), thereby opening up for tax competition. When taxes are set in this non-cooperative mode, there is an incentive for each government to adopt policies to secure an inflow of capital, rather than "losing" it to other countries.

Tax competition can take two forms: either, the government will shift the tax burden from mobile bases (capital) to less mobile bases (such as labor and consumption), or instead it could lower the overall level of taxes (Wilson, 1986, page 296). Thus as tax bases are becoming more mobile, maintaining the initial level of welfare state generosity should be harder.

Not only enterprises and capital, but also people have become more mobile. Thus a mechanism that is closely related to tax competition is welfare migration. Sinn (1994) makes the argument that with higher mobility of people, there is an incentive for governments to cut tax rates for the rich to make them stay in the country and cut down on social benefits to not attract poor immigrants.

In this analysis, I do not take this mechanism into regard, but it is also a clearly important potential influence on welfare state generosity.

4.2 Tax competition and public spending

The argument that tax competition can lead to inefficiently low taxes and public spending was articulated by Oates (1972) and later formalized by Wilson (1986) and Zodrow and Mieszkowski (1986). The theory has since evolved from these basic, symmetric models

into more complex ones, including factors as differences in region size and labor mobility (see e.g. Bucovetsky (1991) and Kessler et al. (2002)). To illustrate the theoretical effects of tax competition in a simple way, I will here use the model developed by Zodrow and Mieszkowski (1986)[8]. The model is originally made to describe a federal state with a number of local governments where fiscal policy-making has been decentralized, but the relationship between these governments can also be used to describe how countries interact, as the same mechanisms in governing tax schemes and public spending are at work here.

The model assumes a world consisting of N identical jurisdictions, each with an equal number of identical residents. Each country is endowed with a fixed supply of an immobile factor (which could be labor, or land, for instance), and together with the capital stock these constitute the two factors of production in the economy. The national capital stock $\overline{K}$ is fixed, and the amount of capital in each jurisdiction is denoted K ($NK = \overline{K}$). Each resident holds an equal share of both the fixed factor and capital, where the latter can be invested in the country of residence or in another country. Capital is perfectly mobile between jurisdictions, whereas citizens are perfectly immobile. As a consequence of mobility, all capital earns the same net return r. The countries are all assumed to be "small" in the sense that each government perceives r as exogenously given.

Output is produced in each country by perfectly competitive firms. The constant returns to scale-production function is increasing and concave (suppressing the fixed factor as argument and letting subscripts denote first and second derivatives):

$$F(K), \quad F_K > 0, \quad F_{KK} < 0 \tag{1}$$

To include the effect on social spending, public services P in each country is defined as public purchases of output financed by a source based property tax T on capital or a lump sum tax H, where the magnitude of H is exogenous. When a jurisdiction impose the source tax, the equilibrium amount of capital in the country is given by $F_K - T = r$, which implicitly defines demand for capital in the country as a function of the before-tax return: $K = K(r + T)$, where

$$\frac{dK}{dT} = \frac{1}{F_{KK}} = \Phi \ < 0$$

-the negative sign on Φ comes from equation 1. Φ represents the distortionary effect of the property tax on capital: If a country increases T, it will expect the capital stock in the country to decrease and thereby lower the income from rent on the fixed factor. The

[8]Presentation based on Zodrow and Mieszkowski (1986), Edwards and Keen (1996) and Wilson and Wildasin (2004).

governmental budget constraint is

$$P = TK(r+T) + H \tag{2}$$

Consumers use their income to purchase a consumption good C, which is produced by private, perfectly competitive firms. These consumers have quasiconcave preferences over public and private goods, represented by the utility function $U(P, C)$. The amount of C is determined from the private budget constraint

$$C = [F(K) - (r+T)K] + r\frac{\overline{K}}{N} - H \tag{3}$$

where the term in square brackets is return to the fixed factor, and the second term on the RHS is return to capital.

The implications of tax competition in such a model will depend on what policymakers' intentions are. In one extreme, they can be assumed to be "benevolent planners" maximizing local residents' utility, in another, governments can be perceived as self-interested Leviathans, taking care of own interests rather than seeking to achieve highest possible level of utility for the citizens. In the latter case, tax competition would increase utility in society - as it will set limits to excessively high tax rates posed by self-interested governments, and "tax competition among different units rather than tax collusion is an objective to be sought for it's own right" (Brennan and Buchanan, 1980, page 186).

Though it might be reasonable to assume that governments in reality lie somewhere between the two extreme cases, in the model presented here policymakers are assumed to be of the former type - they set tax rates to maximize residents' utility subject to the governmental budget constraint.

Samuelson (1954) shows that a necessary condition for maximizing a social welfare function is that the sum of marginal rates of substitution between a public and a private good equals the marginal rate of transformation:

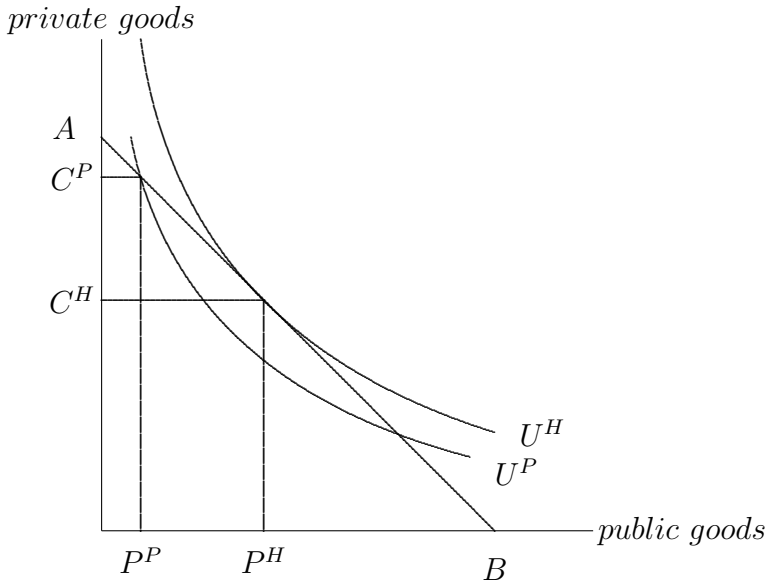
$$\sum MRS = MRT$$

If the government provides the public good until this condition is reached, and finances it by lump-sum taxation, optimum is reached.

In this case, the maximization problem is expressed by substituting 1 and 2 into the utility function:

$$\max_T U\left\{\left[F(K) - (r+T)K + r\frac{\overline{K}}{N}\right], TK + H\right\}$$

Figure 3: Distortionary effects of tax competition and capital taxes



If the government could decide on the level of lump sum taxes H as well as T, the first order conditions for welfare maximization would be:

$$\frac{U_P}{U_C} = 1 \tag{4}$$

$$\frac{U_P}{U_C} = \frac{1}{1 - \frac{T\Phi}{K}} \tag{5}$$

Thus, to achieve the optimal allocation of resources, either T or Φ would have to be zero, such that the marginal rate of substitution between the two goods would be equal to unity. T could of course not realistically be assumed to be zero; although head taxes are efficient, the use of them is limited due to distributional/fairness concerns, so the level of H would normally be restricted (or non-existing) and T non-zero. Because we are dealing with open economies, neither Φ could be zero because of tax competition.

In sum,

$$\frac{U_P}{U_C} = \frac{1}{1 - \frac{T\Phi}{K}} > 1 \tag{6}$$

- public goods are underprovided at the margin. The distortionary effect of openness could be countered by lump-sum taxation, but this tax is exogenous.

Differentiating 2, 3 and 5 with respect to C, P, T and H gives

$$\frac{dT}{dH} < 0$$

so when the exogenous level of lump taxes decreases (no matter the initial value of T), the use of property taxes increases, and the distortionary effect increases. In addition,

$$\frac{dP}{dH} > 0$$

which means that a reduction in the permitted level of lump sum taxes gives a reduction in the provision level of public goods. This is illustrated in Figure 3[9]: The production possibilities frontier is the line AB (with slope equal to minus one), and when only head taxes are used, this generates the indifference curve U^H which maximizes utility. The consumption levels of private and public goods are C^H and P^H respectively. If T is non-zero, then the residents are at a lower level of utility U^P, and consume more of C and less of P (at C^P and P^P, respectively) than in the optimal case.

[9]Figure 1 from Zodrow and Mieszkowski (1986)

5 Literature Review

5.1 Empirical strategies

Based on the theory, there are two main empirical approaches to investigate the relationship between openness and compensation/efficiency:

- Investigate the relationship between openness and tax policy
- Investigate the relationship between openness and welfare state generosity

I will analyze the second approach empirically - so to get the full picture of the empirical dimensions of evidence for the two hypotheses, I review studies on openness and tax policy to summarize the results for this approach, before I review literature on openness and welfare as a backdrop for the empirical analysis in the following sections.

5.2 Evidence of tax competition

The theoretical basis for tax competition in the previous section was, as mentioned, originally made to describe tax competition *within* countries rather than *between* them. Several studies show that municipalities within countries engage in strategic interaction when it comes to tax rates, such that tax rates in one jurisdiction depend on the tax rates in the neighboring jurisdictions, both for property and capital taxes (see e.g. Revelli (2001), Brueckner and Saavedra (2001), Buettner (2001)). When testing for tax competition between jurisdictions within countries, the local tax rate is defined as a function of the neighboring jurisdiction's tax rate (see Revelli (2005)).

Empirically, for tax policies on the country-level, taxes on capital and corporate income have fallen since 1980 in OECD-countries. At the same time, taxes on wages have fallen slightly as well, see table 1.

Using the same type of econometric modelling for international tax-competition as the one described for competition between municipalities, Altshuler and Goodspeed (2002) find evidence for tax competition in capital taxes between European countries, using corporate taxes in percentage of GDP as measure of tax burden. Analyzing statutory capital tax rates, Redoano (2003), reaches the same result and in addition emphasizes that tax competition in statutory tax rates mainly takes place between geographically close countries. Devereux et al. (2008) find that in open economies, i.e. with little capital controls, governments compete in both statutory tax rates and marginal effective tax rates on capital.

Table 1: Average tax rates on wages and capital income for OECD-countries

Period	Taxes on wages	Taxes on Capital [a]
1980-1985:	18.75%	48%
1986-1990:	18.4%	44.45%
1991-1995:	17.03%	37.9%
1996-2000:	16.04%	35.5%

[a]source: OECD.stat and OECD tax database. For taxes on corporate and capital income, data on the years from 1981 onwards are available. For taxes on wages, data for 1979, 1981,1983,1985, 1987, 1989, 1991, 1993, 1994, 1995, 1996, 1997, 1998, 1999 and 2000 are available. I have used 1979 in the 1980-05 average for income taxes.

Another way to test the for tax competition is to disregard the existing tax rates in other countries and test the effect of openness only directly on national tax rates. Using this approach, Quinn (1997) finds that openness has no effect on capital taxation revenue in percentage of GDP. Bretschger and Hettich (2002) however, find a robust, negative relationship between openness and level of effective average corporate taxes[10] is for their panel data on 14 countries from 1967 to 1996. They also find that economic integration has had a significant positive impact on effective average labor taxes.

Swank and Steinmo (2002) find that both liberalization of capital controls and international trade have negative effects on statutory marginal corporate taxes. However, when investigating effective rather than statutory tax rates, they find that liberalization of capital controls has a positive effect on labour taxes (which is consistent with the findings of Bretschger and Hettich), and trade has a positive effect on taxes on consumption, but neither measure of openness has any effect on capital taxes. The theoretical argument behind this result is that although one sees a shift in statutory taxes from mobile to more immobile factors, the effective tax rates remains more or less the same because of the combined effect of the cut in statutory taxes on one hand and fewer tax-based investment incentives on the other.

Dreher (2006b) also finds a negative effect of openness (measured by the KOF-index of economic globalization, see appendix A for details) on statutory tax rates. When testing for the effect on average effective tax rates, he finds a positive effect on capital tax rates, but no effect on average effective tax rates on labour and consumption. It is then argued that the reason for this might be that countries compete for capital by setting average effective tax rates lower, then by increased capital inflow overall tax payment from capital

[10]There are several ways to calculate effective average tax rates. One much used method is found in Mendoza et al. (1994) where for instance the effective average tax rate for capital is calculated by taking the difference between pre-tax and post-tax capital income and divide this by the pre-tax capital income.

is increased and, consequently, so are the tax ratios[11].

Regarding results of the analyses, there is clearly a contrast between the two ways of modelling tax competition; by modelling tax rate in one country as a reaction to tax rates in other countries, the results clearly indicate that tax competition plays an important role. When estimating the effect of openness directly on tax rates, it seems that openness puts downward pressure on statutory capital/corporate tax rates, and the results are diverging for effective tax rates.

However, the results for statutory corporate tax rates from the openness-tax rates analyses seen in the light in the other evidence of tax competition presented here, provide some evidence for the efficiency hypothesis: the mechanisms described in the previous chapter do seem to play a significant role when governments are setting tax rates.

The postulated effect of openness from the theory of tax competition presupposes that this decline in tax rates actually confines governments' ability to spend. To see if the efficiency perspective holds when it comes to welfare provision, we need to evaluate the effect of openness on welfare benefits. This approach is reviewed next, and I also analyze it empirically in chapter 8.

5.3 Openness and welfare state generosity

A selection of the literature[12] is summarized in tables 2 and 3, classified after which type of dependent variable is used in the analysis [13]. The different dependent variables are classified in three categories, volume (measuring social spending), institutional (measuring entitlements) and inequality (measuring redistribution) - variables. All types of variables will be discussed in detail in the next chapter. As we can see in table 2, social spending - variables have been investigated at length, with a variety of country samples, time periods and estimation methods. Different proxies for openness have also been used. The authors find both negative, positive and also sometimes no effect of openness on welfare states. For instance, both Hicks and Swank (1992) and Huber et al. (1993) find that openness, measured by trade/GDP, has a positive impact on social welfare, measured as welfare spending as percentage of GDP and social security transfers as percentage of GDP, respectively, both using Generalized Least Squares-analysis. Garrett and Mitchell

[11]The tax ratio is defined as the ratio of tax revenues to GDP

[12]There are many studies that investigates this link. Here, I have selected the studies with analyses that are similar to my own, in terms of objective of the analysis, time dimension etc., and that are also widely cited.

[13]The tables are simplifying the results from the various analyses in the sense that when several proxies for welfare state generosity and/or openness are used, it might be significant effects on some variables whereas no effect on others, or significant effects of one openness variable but not for others. I here report in which direction the significant effects go.

(2001) however, using Fixed Effects-regression, find that international trade has a significant negative impact on government spending. Yet again, Gemmell et al. (2008) find evidence for the compensation hypothesis using an error correction model - they find no effect of openness, in terms of foreign direct investment and trade, on government size, but a positive effect of stock of inward FDI on social spending in percentage of total spending. They find no significant effect of trade.

One study uses fiscal redistribution as dependent variable, and this study finds no effect of openness. Several studies have used unemployment replacement rates as proxy for welfare state institutions, and the effect seems to go in the negative direction, one example is Korpi and Palme (2003) who when investigating development in replacement rates find that openness, measured as trade/GDP, has a positive effect on the risk of introduction of major cuts in net replacement - i.e. a negative effect on welfare. On the other hand, there is also an example that indicates the opposite effect: Brady et al. (2005), who, using an index of decommodification, find positive effects of both net trade ($exports - imports$) and openness to trade ($exports + imports$) simultaneously.

This overview shows that the results from this empirical approach are ambiguous and it is difficult to draw a clear conclusion from previous studies. For neither type of variable used does the effect of openness seem to go in one specific direction. This may of course be due differences in estimation methods and selection of panels as well as choice of dependent variable. A further description of estimation methods, choice of dependent variables and comments on data are found in the following two sections, leading to my own analysis in section 8.

Table 2: Effect of Openness part 1 : Empirical Results

Author(s)	Dependent Variable	Openness	Est. Met.	Panel/Time	Effect
Hicks and Swank (1992)	Social Spending	Trade/GDP	GLS	18 OECD-countries 1960-82	Positive
Huber et al. (1993)	Social Security transfers, Social Spending	Trade/GDP	GLS	17 OECD-countries 1956-88	Positive
Rodrik (1997)	Government consumption and social spending	Trade/GDP	FE	OECD-countries 1966-91	Negative
Cusack (1997)	Government expenditures	Financial Flows	Pooled OLS	16 OECD-countries 1955 - 89	Negative
Quinn (1997)	Social spending, Government expenditures	Capital account liberalization index and Trade/GDP	Pooled OLS	64 countries 1958-1989	Positive
Rodrik (1998)	Government expenditures	Trade/GDP	OLS	23 OECD-countries average 1990-92	Positive
Garrett and Mitchell (2001)	Social security transfers, government spending, government consumption	Trade/GDP and Capital account liberalization index	FE	18 OECD-countries 1961-93	Negative
Bretschger and Hettich (2002)	Social spending	Trade/GDP and financial openness	PCSE	14 OECD-countries 1967-96	Positive
Brady et al. (2005)	Social spending, social security transfers	Inward FDI, trade, portfolio investment, capital account liberalization index	PSCE	17 OECD-countries 1975-2001	Positive / negative
Dreher (2006b)	Social spending	KOF-index of economic globalization	GMM and dynamic FE	OECD-countries 1970-2000	No effect
Ram (2008)	Public expenditure	Trade/GDP	FE	150 countries 1960-2000	Positive
Gemmell et al. (2008)	Public spending on social protection Government size	Trade/GDP and FDI	ECM	25 OECD-countries 1980-97	Positive

Table 3: Effect of Openness part 2: Empirical Results

Author(s)	**Dependent Variable**	**Openness**	**Est. Met.**	**Panel/Time**	**Effect**
Mahler (2004)	Fiscal redistribution	Trade/GDP, FDI and capital account liberalization index	Pooled OLS	14 OECD-countries 1980-2000	No effect
Carroll (2000)	Unemployment replacement rates	Finance market regulation	FE	18 OECD-countries 1965-1995	No effect
Iversen (2001)	Unemployment replacement rates	Capital account liberalization index and trade/GDP	FE	15 OECD-countries 1965-1993	Negative
Korpi and Palme (2003)	Unemployment replacement rates	Trade/GDP	Intensity regression	18 OECD-countries 1975-1995	Negative
Swank (2005)	Replacement rates for pensions, sickness and unemployment plus decommodification index	Capital account liberalization index and trade/GDP	Pooled OLS	18 OECD-countries 1981-2000	Negative for pensions, positive for unemployment and decommodification
Brady et al. (2005)	Decommodification index	Net trade and trade openness	PSCE	17 OECD-countries 1975-2001	Positive

6 Empirical strategy

To empirically analyze the effect of openness on welfare state generosity, one needs to choose both an appropriate measure of welfare state generosity and which type of econometric analysis to use. As the literature review-tables show, several different dependent variables have been analyzed in different ways. In this chapter I provide an overview over the problem of choosing a welfare generosity measure as dependent variable as well as the theory for my empirical method, fixed effects analysis.

6.1 Estimation with panel data

On the background of the theory and literature review, I formulate the econometric model

$$Welfare_{t,i} = \alpha + \beta \times openness_{t,i} + \boldsymbol{\lambda} \times \mathbf{controls}_{t,i} + \varepsilon_{i,t} \tag{7}$$

where $welfare_{i,t}$ is the choice of dependent variable describing welfare in country i at time t, α a constant term, *openness* is the explanatory variable, *controls* is a vector of control variables, and finally ε is an error term.

The efficiency hypothesis predicts that $\beta < 0$, the compensation hypothesis predicts $\beta > 0$.

As one can see from the results in tables 2 and 3, several econometrics methods have been used to estimate the relationship in equation 7 when using panel data.

Ordinary Least Squares (OLS) - regression gives an estimate of β that minimizes the sum of squared residuals, i.e. deviances from the estimated value to the observed value.

If the following stochastic assumptions hold (Biørn, 2003):

$$E(\varepsilon_{i,t}|openness_{i,t}, \mathbf{controls}_{i,t}) = 0 \tag{8}$$

$$E(\varepsilon_{i,t}\varepsilon_{j,s}) = \begin{cases} \sigma^2 & \text{for } j = i \text{ and } t = s, \\ 0 & \text{else} \end{cases} \tag{9}$$

which in turn implies that

$$E(\varepsilon_{i,t}) = 0 \tag{10}$$

$$var(\varepsilon_{i,t}) = \sigma^2 \tag{11}$$

and we in addition assume no multicollinearity in exogenous variables, then OLS-regression will yield unbiased and consistent results, i.e.

$$E(\hat{\beta}^{OLS}) = \beta, \quad p\lim \hat{\beta}^{OLS} = \beta$$

and be the so-called *Best Linear Unbiased Estimator* (BLUE).

Some research in this area (see tables 2 and 3) has been carried out by pooled OLS, Panel Corrected Standard Errors (PCSE) or Feasible Generalized Least Square (FGLS) analysis. An underlying assumption for using this kind of analysis, with constant intercepts and slopes, is that the model is fully poolable - i.e. that all units, in this case the 18 different countries, will have the same parameter values. Another important implication of this type of analysis is a potential omitted variable problem. As Garrett and Mitchell (2001, page 163) point out, OLS might not be a sufficient way of carrying out the analysis due to the possibility of "inherent features of different countries that affect the outcomes of interest, but that are not accurately captured by any of the included regressors", and thus cross-country heterogeneity should be taken into account. In other words, there might be unobserved characteristics determining welfare state generosity leading to biased and consistent estimates if the omitted variables are correlated with openness (Greene, 2003).

The simplest way to solve this problem is to allow for intra-unit heterogeneity by using *fixed effects* or *random effects* models (Beck, 2006). These methods allow for different intercepts, but has constant slopes. The fixed effects (FE)-estimator (or the "within group"-estimator) utilizes variation within each observation unit. The between effects (BE) -estimator (or the "between groups"-estimator) utilizes variation between observation units. The OLS-estimator from the pooled data is an unweighted average of the FE and BE-estimators. The random effects (RE) -estimator provides a weighted average of FE and BE-estimators, using information from both variation on each observation units as well as variation between them (Kennedy, 2003).

These methods use either dummies for country to capture country-specific effects(a one-way model), or both country and time-dummies (a two-way model). For observations on $i = 1...N$ countries for $t = 1...T$ time periods, the two way model is formulated as

$$Welfare_{i,t} = \alpha + \beta \times openness_{i,t} + \boldsymbol{\lambda} \times \mathbf{controls}_{i,t} + \boldsymbol{\mu}_i + \boldsymbol{\gamma}_t + \varepsilon_{i,t} \qquad (12)$$

where $\boldsymbol{\mu}_i$ and $\boldsymbol{\gamma}_i$ are dummies for country and year, respectively. The equation is estimated by OLS. This model will then have intercepts that vary over country as well as time.

In sum, I choose to carry out the analysis by estimating equation 12 by FE-regression.

6.1.1 Fixed versus random effects

The RE-estimator is more efficient than FE because it utilizes information from both within and between estimators, but it will be biased if its composite error (consisting of the "usual" error term and a "random intercept" term - measuring to which degree an individual's intercept differs from the overall intercept) is correlated with the regressors (Kennedy, 2003). The FE-estimator will in any case be unbiased because it includes dummies for the intercepts and is always consistent.

Using the Hausman test to test the null hypothesis that the RE-coefficients are the same as the FE-coefficients, I find that it might be safe to use RE-estimation in very few cases only. As the results from these RE-estimations do not change the result of the analysis in any way, I use FE-regression to get consistent results throughout the analysis.

6.2 How to analyse welfare state generosity - the dependent variable problem

The theory of tax competition predicts that the effect of openness is negative, and the compensation hypothesis postulates the opposite. But what exactly is welfare state generosity? To analyse the compensation versus efficiency - question empirically, one needs to define the precise aspect of welfare one is interested in. Hence all empirical research on welfare state change face the *Dependent Variable Problem* - or how to "conceptualize, operationalize and measure change within welfare states" (Clasen and Siegel, 2007, page 4). What kind of measure of welfare one chooses will necessarily have an impact on the outcome of the analysis. So when measuring how welfare policies have developed, what exactly should the measure be?

What will be a natural starting point for measuring changes in welfare programmes will depend on what one considers to be the prime characteristics of a welfare state. One option is to base the analysis on the institutions of the welfare state, looking at changes in welfare program structure over time - what Clasen and van Oorschot (2002) label the "legal" perspective (and which I label the "institutional perspective"), as it is supposed to measure qualitative changes in the welfare state rather than quantitative.

Another way of defining welfare state change is related to welfare programmes. Cutbacks in a particular benefit, or in the total amount of social expenditure - this "volume" perspective (Clasen and van Oorschot, 2002) measures quantitative changes in welfare state generosity.

Yet another point of departure for measuring change is to look at how governmental transfers affect the distribution of disposable income.

Summing up, traditionally there have been three main ways of approaching the de-

pendent variable problem:

1. Measuring changes in income distributions - the inequality perspective
2. Measuring changes in transfers - the volume perspective
3. Measuring changes in welfare programmes - the institutional perspective

The first has the advantage that it measures exactly the changes in the structure of welfare state entitlements, the second that it describes how changes in the quantity of transfers the citizens actually get, the third that it measures the distributive effects of these transfers.

These measures are not necessarily strongly correlated - for instance a small change in an institutional arrangement could have large implications for many inhabitants in a country, and likewise a profound change of structure in a welfare state system might not be of great importance when implemented. As an illustration, in 1982, a part of the Danish pension system was restructured: in the traditional universal welfare system, means testing in old age pensions were introduced (Green-Pedersen, 2004, page 10). This had a significant impact on entitlements for inhabitants between 67 and 69 years of age only, and would according to the volume perspective be considered as negligible. In the institutional perspective however, this is a clear deviation from the characteristics of the Scandinavian universal welfare state, and could thus be considered as a very important institutional change.

Hence a first-best solution to the dependent variable problem would be a combination of these three, or at least the second and the third, such that aspects of social rights and volume of redistributive transfers both have a say in the measure of welfare generosity. Such a measure is not available (and would indeed be very hard to construct), and the option for empirical research is to use one or more of the three approaches.

6.2.1 Examining welfare programmes - the volume perspective

The research on openness and welfare state policies has to a large extent been focusing on the volume perspective, as the data for government spending are quite reliable and easy to collect, and to investigate the link between the two competing hypotheses on compensation and efficiency and government spending on social security is relatively straightforward. The link between spending variables and welfare state generosity is not so straightforward, however; social spending says nothing about exact entitlements or quality of welfare state programmes.

This approach can be further divided in two subcategories: both social spending and total government spending, or government size, have been used as volume proxies for

welfare.

Social spending: As Siegel (2007) points out, social expenditure is the largest component of total governmental outlays in all OECD democracies, and can thus be a very useful tool for comparing welfare states and their development over time. Social expenditure-variables are sensitive to other variables such as political decisions, social need and the size of GDP, which as a consequence need to be controlled for in empirical analysis. In addition, Green-Pedersen (2007, page 19) points out that the effects of political decisions on social spending are not necessarily immediate - there will be some time lag before we see the implications of legislative changes on social outlays, and moreover, it is hard to distinguish whether a high welfare budget means higher welfare or simply an inefficient welfare system.

Government size: Following the same kind of argument for social spending as welfare variable, total government expenditure is also used in welfare research. Rodrik (1998), who finds evidence for the compensation hypothesis using this variable (and also by using social spending), simply states that "government expenditures are used to provide social insurance against external risks". Welfare state generosity is then conceptualized not only as the social aspect of public spending, but to include all other categories of public spending as well, and welfare state generosity is defined in a very broad way.

6.2.2 Examining welfare programmes - the inequality perspective

Another starting point for examining government policies and spending is to look at how the states redistribute income among the citizens. To make the link between redistribution and welfare plausible, one must take a utilitarian approach - making the non-controversial assumption that utility is increasing and concave in income x,

$$U(x), \quad U_x > 0, \quad U_{xx} < 0 \tag{13}$$

such that redistribution from richer to poorer persons actually enhances overall utility and hence welfare.

This link is made dubious however, by the fact that an inequality index does not say anything about the *level* of welfare - clearly, a poor country with a low inequality score does not necessarily have better welfare than a rich country with a higher inequality score.

A popular choice of inequality measure is the Gini-coefficient, calculated by the formula

$$G = 1 - 2 \int_0^1 L(X)\, dX.$$

where $L(X)$ is the Lorenz curve, which is a graphical representation of the cumulative distribution function which shows for the bottom $X\%$ of individuals, what percentage of total income this fraction has. The Gini-coefficient takes a value between 0 and 1 - the closer to 0, the more evenly distributed is income in the society. If the coefficient takes the value of 1, only one person gets all the income.

To see the effect of the welfare state on the Gini-coefficient, Mahler and Jesuit (see Mahler and Jesuit, 2004, 2006, LIS, 2008)) have constructed a "Fiscal Redistribution Data Set" using data from the Luxembourg Income Study, where the Gini-coefficient on gross income, before taxes have been deducted and social transfers added, is contrasted with the coefficient on disposable income - i.e after taxes and transfers. Thus, this pre/post approach gives us the opportunity to see how governmental redistribution evolves over time.

Bergh (2005) argues that this use of the inequality index is problematic because the welfare state system will necessarily affect both the market income as well as the income after taxes and transfers. Moreover, it is impossible to distinguish the effect of changes in the tax system from changes in transfers.

This approach is quite new, and as table 3 shows, not much has yet been written using the fiscal redistribution variable.

6.2.3 Examining welfare programmes - the institutional perspective

The last approach to conceptualizing welfare state change is, instead of focusing the volume of transfers or redistributive effects of these transfers, to investigate changes in the institutional characteristics of the social transfers citizens in a country are entitled to get.

Are there changes in the pension scheme? Increasing or decreasing unemployment benefits? More or less means testing?

Emphasizing what the welfare state system actually intends to provide for the inhabitants of a country gives another picture of welfare state generosity than merely social security spending.

The obvious drawback of this approach is that summing up all the entitlements in a welfare system in one single index cannot be done easily. One solution has been to focus on replacement rates, as these are one of the core variables for institutional characterization.

Following Esping-Andersen, the ideal would be a an index of decommodification - and he actually does construct a measure of decommodification in pension-, sickness-

and unemployment benefits for the US, New Zealand, Japan and Western European countries in 1980 (Esping-Andersen, 1990, page 50), but these are measured relatively and the data is not made public - so the index is impossible to update (Lindbom, 2001).

Detailed datasets on core social security variables exist (see, for instance, Korpi and Palme (2007)). A few attempts have been made to construct indexes for social entitlements from such data. One prime example is Lyle Scrugg's decommodification index (see Scruggs (2004)).

The empirical research on institutional measures has mainly focused on certain entitlements, often replacement rates, rather than an index to describe several entitlements. A decommodification index consist mainly of sickness, pensions and unemployment benefits, so replacement rates in these programmes may therefore serve as proxy for welfare state institutions.

7 Data

The data used is cross-section time-series data, with yearly observations from 1970/1980 (depending on which welfare variable investigated) until 2000 for 18 OECD countries. The selection of countries is Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom and the United States.

7.1 Dependent variables

There are three main categories of dependent variables: volume variables, inequality variables and legal variables.

Volume variables:

Previous studies use mainly three different variables in this category: from OECD-data, a measure of social security transfers in percentage of GDP ($SSTRAN$), social transfers in percentage of GDP ($SOCX$) (which is very often used) and total public expenditure, which is a proxy for government size ($PUBEXP$).

The difference between the first two variables is that $SSTRAN$ covers social assistance grants and welfare benefits paid by general government benefits for sickness, old-age, family allowances, social assistance grants and unfunded employee welfare benefits, whereas $SOCX$ includes total social public expenditure, meaning expenditure related to old age, survivors, family, health care, active labour market programmes, unemployment and housing as well as some other social policy areas (e.g. income maintenance and emergency relief) (OECD, 2007), and is thus a more widely defined variable.

The $SSTRAN$-variable has the advantage that it covers the years 1970-2000, where $SOCX$ only has the time span 1980-2003. In addition, a more narrow definition might have the advantage of being less noisy than a variable that contains a much wider selection of factors. As stated in chapter 6.2., a first best solution to the dependent variable problem would contain both welfare spending and welfare institutions. By definition, $SSTRAN$ is closer to this first-best than $SOCX$, as it follows specified social transfers over time rather than gross public social expenditure.

Although $SSTRAN$ has been used in several studies, see e.g. Huber et al. (1993), Garrett (2001) and Brady et al. (2005), there is a drawback of using this variable - its validity is questionable. As can be seen in figure 4, although in several cases $SSTRAN$ and $SOCX$ seem to follow the same trend, for some countries $SSTRAN$ has some abrupt changes of level, both positive and negative, which seem very puzzling - consider for instance the graphs for Italy, Japan and the Netherlands. This suggests that using

SSTRAN in empirical research is problematic.

In sum, the three traditional variables are either too widely defined (*PUBEXP* and *SOCX*), have too short time span (*SOCX*) or are most likely simply invalid for inference (*SSTRAN*).

To solve this problem, I use a new variable similar to *SSTRAN*, namely public spending on social protection, *SOCPRO*, as found in Sanz and Velázquez (2007) and Gemmell et al. (2008). This variable is based on the *COFOG* classification of social protection (UN, 2000) and includes sickness and disability benefits, old age pension, unemployment compensation benefits, family and child allowances and assistance to groups with special needs (young, elderly and handicapped). The data for this variable goes from 1970 until 1998[14], so it has both the advantage of a long time dimension, as well being more narrow than total social expenditure.

As both *SSTRAN* and *SOCX* have been popular social spending measures in welfare state research (see tables 2 and 3), I include both *SSTRAN* and *SOCX* in the analysis to compare results, and I also include *PUBEXP* to see if openness has any effect on government size.

Inequality variable: I use the variable Absolute Redistribution, *REABS*, i.e. $Gini_{pre} - Gini_{post}$. However, the LIS Fiscal Redistribution Dataset (mentioned in chapter 6.2.2) contains only a few observations - for my panel and time dimension only 63 observations altogether, which makes substantial estimation difficult. However, Solt (2008) has recently constructed pre-and post Gini measures by standardizing the UN World Income Inequality Database (WIID) using a missing-data algorithm, and collected these in the SWIID-dataset. I have computed the *REABS*-variables from this dataset.

Institutional variable: Esping-Andersen has a ranking of welfare states according to scores on the decommodification index in 1980. An attempt to reconstruct this index has been made in Scruggs and Allan (2006). So in this category I use Scruggs' Generosity Index [15] labeled *GEN*, described in table 4. The classification of countries is altered slightly from the Esping-Andersen typology to the Scruggs-typology, as can be seen in the table.

7.2 The Independent Variable Problem

As several proxies for openness have been found in previous literature, one stands out when considering frequency of use: trade with other countries as percentage of GDP.

[14]There is no data available for the United States, so the sample size is then down to 17 countries.

[15]Which is based on the Esping-Andersen decommodification index, but the calculation is somewhat different.

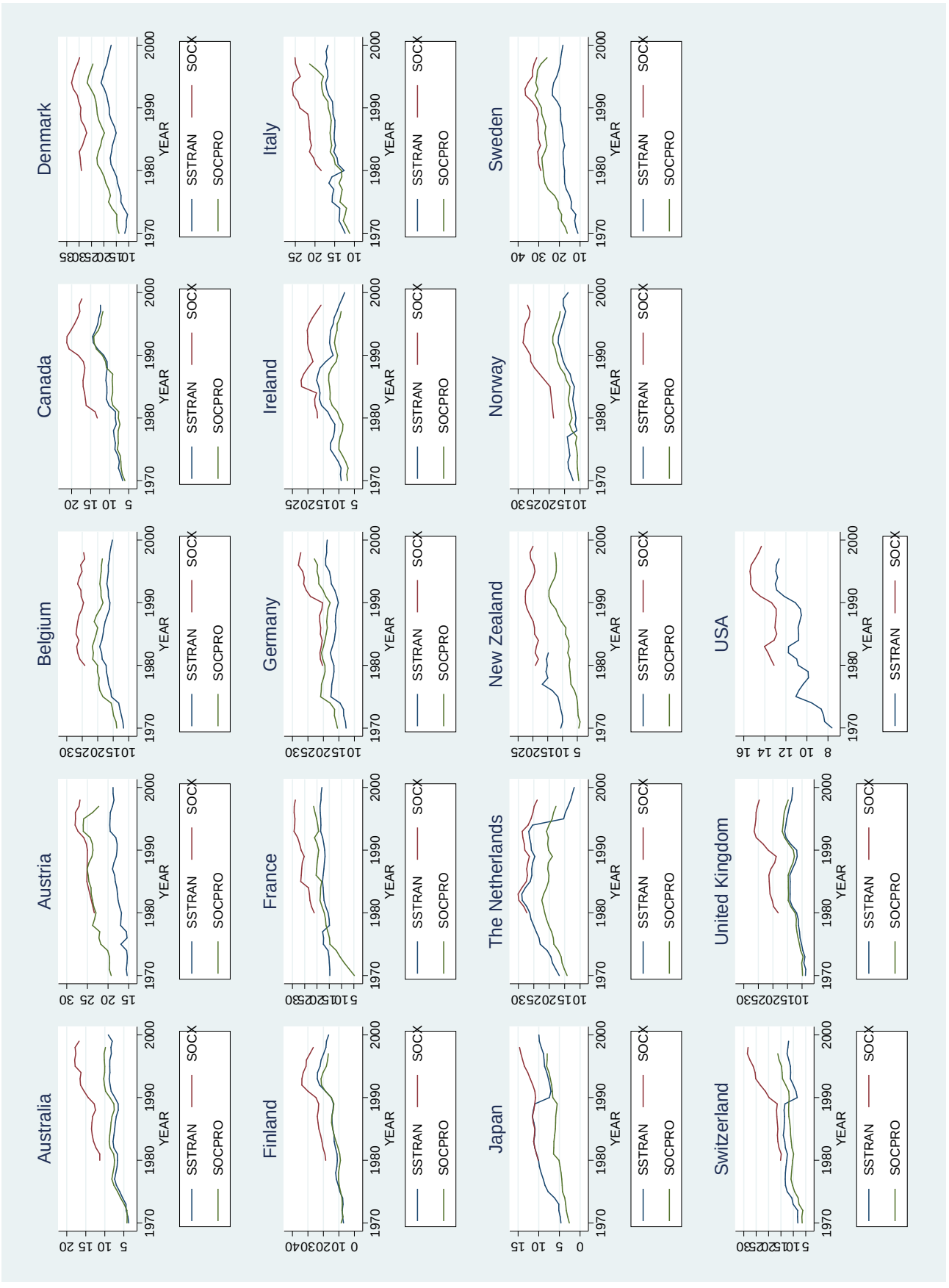


Figure 4: Volume variables 1970-2000

Table 4: Classification of Welfare States according to degree of decommodification, 1980

Author	Welfare State	Countries
Esping-Andersen:	Universal:	Sweden, Norway, Denmark, Austria, Belgium, the Netherlands
	Conservative:	Germany, France, Italy, Finland, Switzerland, Japan
	Liberal:	United States, United Kingdom, Canada, Ireland, New Zealand, Australia
Scruggs:	Universal:	Sweden, Norway, Denmark, Belgium, the Netherlands, Switzerland
	Conservative:	Germany, France, Finland, New Zealand, Canada, Austria
	Liberal:	United States, United Kingdom, Ireland, Australia, Japan, Italy

As Rodrik (1997, page 58) says about using trade as proxy for openness:"Imperfect as it is, this measure should capture to some extent the manoeuvering room that domestic agents - private and public - have". For instance Garrett (1995) and Bretschger and Hettich (2002) simply assume that capital mobility and openness to trade in a country are positively correlated.

Consequently, I use international trade as my measure of openness. Economic openness, however, is a concept with many facets. It would therefore be useful to evaluate several aspects of economic integration to confirm results - and to check if the net effect of openness might be different than indicated by international trade. In sensitivity analysis I discuss this in detail by utilizing (FDI)[16] as openness-measures, to see if the effects are the same. I also utilize another alternative openness-measure; the KOF-index of economic globalization (Dreher, 2006a) is an attempt to sum up the effects of different aspects of openness. The index includes both actual flows (trade and FDI) as well as normative restrictions (capital account restrictions, trade barriers). The index takes a value between 0 and 100. Details on the variables included, weighting and calculation method can be found in appendix A.

[16]The OECD-benchmark definition of FDI says that "Foreign direct investment reflects the objective of obtaining a lasting interest by a resident entity in one economy ("direct investor") in an entity resident in an economy other than that of the investor ("direct investment enterprise"). The lasting interest implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence on the management of the enterprise. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated." (OECD, 1999, page 7-8).

Table 5: Expected effect on welfare variables by explanatory and control variables

Variable	Expected Effect
Openness	Positive/Negative
Population size	Negative
Fraction of population under 15 years (PLT15)	Positive
Fraction of population above 65 years (PO65)	Positive
Unemployment (UNEMP)	Positive
Economic growth (EGROWTH)	Negative
Percentage of left seats in cabinet (LEFTCAB)	Positive
Percentage of center seats in cabinet (CNCAB)	Positive
GDP per capita (RGDPL)	Negative

7.3 Control variables

As mentioned at the beginning, many variables apart from economic integration are likely to affect welfare state generosity. To minimize the chance of getting omitted variable bias I add a number of control variables to the analysis.

7.3.1 Demographic variables

The fraction of population under 15, *PLT15*, and the fraction of population over 65, *PO65* are included because a high share of either of these is likely to be associated with higher government spending, due to pensions, child care benefits et cetera. I also add the control variable population size, *POP*, as a proxy for country size, as there has been some debate on whether positive effects of openness on government size really stems from the relationship between government size and country size [17].

7.3.2 Macroeconomic variables

First, I include economic growth, *EGROWTH*. Bretschger and Hettich (2002) argue there are two aspects of economic growth: first, in a given time, the higher growth in a country, the lower should the capital taxation be, and hence result in a lower level of welfare state generosity; second, that growth in itself might take care of the higher risk citizens are exposed to by increased openness. In sum, economic growth is likely to be negatively associated with welfare variables.

I also control for size of GDP, *RGDPL* - as stated earlier, when using measures like

[17] See Alesina and Wacziarg (1998), who find that governments are smaller in larger countries, and smaller countries tend to be more open - which can account for the fact that openness is correlated with government size, and the counterargument in Ram (2008).

social spending as percentage of GDP, it is important to control for the size of GDP as the dependent variable will be sensitive to the size of GDP as well as the social outlays. A higher level of GDP should thus be associated with a lower level of welfare spending.

Unemployment, *UNEMP*, is included as higher unemployment is likely to put upward pressure on government spending, especially regarding income transfers.

7.3.3 Political variables

Fraction of left seats in parliament and the fraction of center seats in parliament are both included as they could be associated with higher public spending. As (Huber et al., 1993) I use left ($LEFTCAB$) and center ($CNCAB$) seats, respectively, as percentage of seats held by all government parties, as these are expected to have more direct impact on social policy than number of seats in parliament.

The expected signs of coefficients in estimating equation 7 are summarized in table 5. Information about the data is summarized in table 6.

Table 6: Summary statistics

Variable	Description	Source	Mean	Std. Dev.	N
SSTRAN	Social security transfers in percentage of GDP	OECD	14.208	4.473	534
SOCPRO	Public spending on social protection in percentage of GDP	Sanz and Velázquez (2007)	14.952	6.262	480
SOCX	Social expenditure in percentage of GDP	OECD	20.987	5.377	364
PUBEXP	Total public expenditure in percentage of GDP	OECD	43.717	9.243	521
REABS	Absolute fiscal redistribution	Solt (2008)	14.453	4.985	487
GEN	Welfare generosity index	Scruggs (2004)	27.196	7.477	538
TRADE/GDP	Import + exports in percentage of GDP	Penn World Tables	62.213	29.784	558
KOF-INDEX	Index of economic globalization	Dreher (2006a)	66.98	15.088	558
Inwardflows	Inward flows of FDI, percentage of GDP	UNCTAD	1.441	2.59	514
Inwstock	Inward stock of FDI, percentage of GDP	IMF	14.963	13.588	332
POP	Population (in thousands)	LIS (2004)	39227.849	58014.094	558
PLT15	Population under 15 years (thousands)	LIS (2004)	8291.74	12924.04	558
PO65	Population over 65 year (thousands)	LIS (2004)	4990.925	7062.687	558
UNEMP	Total labor force unemployed (thousands)	LIS (2004)	1125.064	1770.355	549
EGROWTH	Growth in GDP	OECD	2.855	2.254	544
LEFTCAB	Left seats as percentage of seats held by all government parties	LIS (2004)	35.572	38.906	558
CNCAB	Center seats as percentage of seats held by all government parties	LIS (2004)	16.356	29.303	558
RGDPL	Real GDP per capita (Laspeyres)	LIS (2004)	18247.007	4213.133	558

8 Results

8.1 Pooled OLS-results

As a benchmark, I present the results for effect of international trade on welfare state generosity when using pooled OLS. Table 7 shows results for all 3 categories of dependent variables, 6 variables altogether : columns 1-4 display the results for the volume variables, columns 5 and 6 for the institutional variable and redistribution variable, respectively.

The results from this model suggests that international trade has a significant positive effect on *SOCPRO* and *PUBEXP*, whereas no effect on the other variables. This analysis thus suggests evidence in favor of the compensation hypothesis, but only for volume variables.

However, as discussed in chapter 7, I suspect that this type of analysis might yield biased and inconsistent estimators due to omitted country-specific effects. F-tests for dummies for country clearly reject the null hypothesis that the coefficients for these are the same, for all my dependent variables[18]. Because of significant country-specific effects, I proceed to take these effects into consideration by estimating equation 12. The results for this analysis are discussed in the next paragraph.

8.2 Fixed effects-analyis

The main results from the analysis, i.e. estimating equation 12, are found in table 8.

The results are strikingly different from the pooled OLS-estimation, now, the coefficient for international trade is overall negative, and it is statistically significant for two of the volume variables, *SOCPRO* and *SOCX* as well for the inequality variable *REABS*. For *SOCPRO*, one standard deviation increase in international trade (29 percentage points) reduces public spending on social protection by 2 percentage points, the corresponding number for *SOCX* is 1.2 percentage points. For the *REABS*-variable, one standard deviation increase in trade gives 3.5 points unit reduction in the difference $Gini_{pre} - Gini_{post}$, i.e. the difference in inequality measured on the Gini-scale increases by 3.5 points. A simple illustration of this result: in Sweden in 2000, the value of *REABS* was 26.2. An increase in international trade of two standard deviations would then decrease this value almost down to the level of *REABS* for the United Kingdom, which is 18.6 in the same year. Because this variable contains both taxes and transfers, this effect might be due to either a less progressive tax system or less transfers - or of course a combination of both. For *PUBEXP* international trade has no effect.

My result is thus the opposite of Rodrik (1998) - trade does *not* increase government

[18]This also holds for dummies for year.

Table 7: OLS-regressions with time fixed effects

	(1) SSTRAN	(2) SOCPRO	(3) SOCX	(4) PUBEXP	(5) GEN	(6) READS
TRADE/GDP	0.06	0.08**	0.04	0.10*	0.08	-0.01
	(1.45)	(2.17)	(1.55)	(1.89)	(1.72)	(-0.46)
POP	-0.00	-0.00	-0.00	-0.00*	-0.00	0.00*
	(-1.53)	(-1.60)	(-1.22)	(-2.00)	(-0.95)	(1.81)
PLT15	0.00	0.00	0.00	0.00	0.00	-0.00
	(1.23)	(0.90)	(0.59)	(1.41)	(0.60)	(-1.35)
PO65	0.00	0.00*	0.00	0.00*	0.00	-0.00
	(1.53)	(1.84)	(1.41)	(1.95)	(0.87)	(-1.52)
UNEMP	0.00	0.00	0.00	0.00	-0.00	-0.00
	(0.61)	(0.26)	(1.42)	(1.29)	(-0.43)	(-0.75)
EGROWTH	-0.45**	-0.58**	-0.75***	-1.01***	-0.37	-0.25
	(-2.85)	(-2.67)	(-3.06)	(-2.94)	(-1.56)	(-1.23)
LEFTCAB	0.01	0.04**	0.03*	0.03	0.04**	0.02*
	(0.86)	(2.49)	(1.88)	(1.43)	(2.46)	(1.77)
CNCAB	-0.02	-0.01	-0.00	-0.01	0.01	-0.01
	(-1.33)	(-0.22)	(-0.07)	(-0.27)	(0.36)	(-0.67)
RGDPL	-0.00	0.00	-0.00	-0.00	0.00**	-0.00
	(-1.08)	(0.53)	(-0.18)	(-0.92)	(2.34)	(-0.63)
Observations	512	459	364	500	530	478
Est. Method	OLS	OLS	OLS	OLS	OLS	OLS

t statistics in parentheses

Constant term and dummy for time included in the analysis,
but not reported.

Time dimension: 1970-2000, except 1980-2000 for SOCX, 1970-1998 for SOCPRO
and 1971-2000 for GEN.

Number of countries: 18, except 17 for SOCPRO.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Trade and welfare state generosity

	(1) SSTRAN	(2) SOCPRO	(3) SOCX	(4) PUBEXP	(5) GEN	(6) REABS
TRADE/GDP	-0.02	-0.07***	-0.04*	-0.06	-0.00	-0.12**
	(-1.42)	(-4.02)	(-1.83)	(-1.67)	(-0.23)	(-2.17)
POP	-0.00	-0.00**	-0.00	-0.00**	-0.00***	0.00
	(-1.34)	(-2.17)	(-0.42)	(-2.73)	(-2.94)	(0.78)
PLT15	0.00*	0.00	0.00	0.00*	0.00**	0.00
	(2.11)	(1.74)	(0.71)	(2.08)	(2.12)	(0.05)
PO65	0.00	0.00	0.00	0.00***	0.00**	-0.00*
	(1.50)	(1.69)	(0.87)	(3.27)	(2.33)	(-1.77)
UNEMP	0.00	0.00	0.00	-0.00	0.00	0.00
	(0.36)	(1.44)	(1.33)	(-1.04)	(1.69)	(1.13)
EGROWTH	-0.10**	-0.12**	-0.23**	-0.39***	-0.12**	-0.09
	(-2.14)	(-2.39)	(-2.59)	(-4.03)	(-2.37)	(-0.73)
LEFTCAB	-0.01*	-0.00	-0.01	-0.01	0.00	-0.00
	(-2.08)	(-0.14)	(-1.45)	(-0.93)	(0.87)	(-0.20)
CNCAB	-0.01	-0.00	-0.00	-0.02*	0.01	-0.01
	(-1.65)	(-0.19)	(-0.52)	(-1.97)	(0.94)	(-1.46)
RGDPL	-0.00***	-0.00***	-0.00***	-0.00***	0.00***	0.00
	(-3.24)	(-3.57)	(-3.14)	(-6.14)	(4.83)	(0.63)
Observations	512	459	364	500	530	478
Est. Method	FE	FE	FE	FE	FE	FE

t statistics in parentheses

Constant term and dummies for year and country included,

but not reported.

See notes to table 7.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

size, nor does it increase social spending. Because I use a long panel and find significant country - and year specific effects, and Rodrik's analysis ignores this dimension by using only the average of three years as observation, this might account for the difference in results.

Based on how they are defined, the effect of openness on three social spending variables should be correlated, in particular the effects on *SSTRAN* and *SOCPRO*. But while there are significant effects of openness for *SOCPRO* and *SOCX*, the result for *SSTRAN* has the same sign with a lower point estimate in absolute value - but is not significant. As I have already stated, results using *SSTRAN* are most likely not trustworthy, and this result substantiates this claim.

As one of the aims with this analysis was to see if the effect of openness is correlated among different welfare variables, I have confirmed this with respect to social expenditure variables and redistribution. In the light of this, we could expect that openness would have a similar effect on generosity (*GEN*). That this is not the case, provides some substance for theories which emphasize that welfare state institutions hardly change much over time (see Pierson (1996)), and by that also provide counter-evidence for theories of welfare state convergence as a consequence of increased openness[19]. In other words, we find that institutional arrangements for welfare benefits are not altered as a result of increased openness, but instead openness exerts downward pressure on how much is spent on these entitlements and possibly also on redistribution via a progressive tax system.

While social spending and fiscal redistribution are negatively affected by openness, the size of the negative effect is not very large. There is no sign that increased economic integration undermines the welfare state, openness rather restrains it somewhat. Although the studies summarized in table 2 differ in whether they find evidence for the compensation hypothesis or the efficiency hypothesis, most of them seem to agree on that the effect of openness is not very large; where Brady et al. (2005), using PCSE-analysis, find that a one percentage point increase in international trade decreases *SOCX* by 0.1 percentage point (compared to 0.04 percentage points here), e.g. Hicks and Swank (1992), using GLS, find that a one percentage point increase in international trade increases social spending in percentage of GDP by 0.02 percentage points. An exception is Quinn (1997), who finds that the corresponding number, using OLS-analysis, is 0.6.

[19]As described in chapter 7.1, the welfare state generosity index is based on the decommodification index, which divides welfare states into three categories (see table 4). I also run the same regression for the countries within each category to see if there could be different results with regard to different welfare states, but the effect of openness is still insignificant for each category.

8.2.1 Effect of control variables

The differences between the categories of dependent variables are evident also with respect to the control variables included.

Regarding the demographic variables, the small point estimate for population size comes out with a significant negative effect for *SOCPRO, PUBEXP* and *GEN*, which to some extent confirms Alesina and Wacziarg (1998)s hypothesis that larger countries have smaller governments - for this panel, the effect is just very small.

Fraction of population under 15 and over 65 years of age are both significant for *PUBEXP* where the effect is positive, but small. For *SSTRAN*, population under 15 is positive and significant, and for *DECOM* population over 65 is positive and significant. This confirms the expectation that an increase in fraction of population that are not part of the workforce can cause higher demand for social spending, and moreover, it also influences institutional arrangements.

However, for *READBS*, *PO65* is *negative* and significant. That an increase in the fraction of population that is retired should lead to *less* redistribution, is rather unexpected.

For the macroeconomic variables, the effect of unemployment is overall negligible, except for *SOCPRO* where the positive point estimate is significant at the 5% level.

The most interesting control variable turns out to be economic growth - the influence of this variable on all the volume variables is unambiguous; it clearly has a negative effect. For *SOCPRO* one standard deviation increase in economic growth (2.5 percentage points) gives a 0.3 percentage point decrease. It is also negative and significant for the institutional variable *GEN*. This result is similar to that in e.g. Garrett and Mitchell (2001).

While the most common argument for this mechanism is simply that in good times, less benefits are needed, Bretschger and Hettich (2002) link economic growth to the theory of tax competition: because tax rates are predetermined (i.e. the decisions are made before the taxes are collected), the revenues from taxes will increase when growth is high and decrease when growth is low. By taking exogenous business cycle shocks into account, their reasoning is that in a positive shock, the domestic interest rate will increase, and hence increase capital outflows, whereas in a negative shock, it will decrease - and the country will increase capital inflow. Thus a rational government in the tax-competition model will lower tax rates during the positive shock to attract capital in spite of the high interest rate.

Level of GDP per capita has a negative and significant effect for all volume variables, and a significant positive effect for generosity - which is the opposite of what I hypothesized, but the effect is very small.

For redistribution, however, there is no effect of economic growth or level of GDP.

The political variables turn out not to be very influential - and the few significant point estimates (on *SSTRAN* and *PUBEXP*) are actually negative. In contrast, Huber et al. (1993) find a positive effect for *CNCAB* on social benefits, but they also find a significant negative effect of *LEFCAB* on the same variable.

These results seem a bit suprising, but estimating causal effects of political control without bias is difficult because parties are not randomly selected into government, and a correlation does not necessarily imply causality, see Pettersson-Lidbom (2006). The results should thus be interpreted with care.

The dependent variable that stands out the most when it comes to effect of control variables, is redistribution: economic growth has a negative effect on all volume variables and the institutional variable, but none on redistribution. The same is true for level of GDP per capita. In fact, the only control variable which actually influences redistribution is fraction of population over 65 years old, and this influence is very small.

8.3 Sensitivity analyses

To ensure that the results in table 8 are robust, this section provides tests for business cycle effects, effects of other openness-measures and for possible endogeneity problems - both for the explanatory variable and for control variables.

8.3.1 Testing for effects of business-cycle fluctuations

If the results in table 8 are driven by business cycle mechanisms (i.e. both the dependent variable and some of the right hand side variables of equation 12 fluctuate with the state of the economy), rather than displaying real effects of the explanatory variable and control variables, I check for this by estimating equation 12 using 5-year averages - see table 9. This robustness check is particularly important for the variables that are measured in terms of GDP (which in this case are all volume variables, trade, economic growth and of course level of GDP). This could potentially cause a spurious relationship between openness and welfare state generosity. If the results are indeed driven by such effects, I would expect to find that the significant results in table 8 to disappear when estimating on the averages. But the negative effect of trade is still significant for *SOCPRO*, *SOCX* and *REABS* - the significance level for *SOCX* actually increases. The absolute value of the point estimates for *SOCPRO* and *REABS* decreases, whereas for *SOCX* it increases, so there is no reason to suspect that table 8 displays a spurious relation between openness and welfare state generosity.

Table 9: Fixed effects analysis with 5-year averages

	(1) SSTRAN	(2) SOCPRO	(3) SOCX	(4) PUBEXP	(5) GEN	(6) REABS
(mean) tradegdp	-0.02	-0.05**	-0.08***	-0.04	0.00	-0.11**
	(-0.83)	(-2.50)	(-2.97)	(-0.99)	(0.09)	(-2.15)
(mean) pop	-0.00	-0.00	-0.00	-0.00	-0.00**	0.00
	(-0.63)	(-1.46)	(-1.62)	(-0.55)	(-2.67)	(0.70)
(mean) plt15	0.00	0.00	0.00*	0.00	0.00*	-0.00
	(1.53)	(1.28)	(1.89)	(0.71)	(1.99)	(-0.01)
(mean) po65	0.00	0.00	0.00	0.00	0.00*	-0.00
	(0.77)	(0.96)	(1.15)	(1.22)	(2.07)	(-1.39)
(mean) unemp	0.00	0.00	0.00	-0.00	0.00	0.00
	(0.17)	(1.21)	(1.17)	(-1.70)	(1.67)	(0.91)
(mean) egrowth	-0.32	-0.30	-0.57**	-1.35***	-0.11	-0.09
	(-1.55)	(-1.57)	(-2.50)	(-3.37)	(-0.58)	(-0.24)
(mean) leftcab	-0.01	0.00	-0.00	-0.01	0.01	-0.00
	(-1.68)	(0.09)	(-0.48)	(-0.88)	(0.91)	(-0.18)
(mean) cncab	-0.02	-0.00	-0.00	-0.04	0.01	-0.02
	(-1.12)	(-0.13)	(-0.26)	(-1.43)	(1.02)	(-1.22)
(mean) rgdpl	-0.00*	-0.00***	-0.00	-0.00***	0.00***	0.00
	(-1.86)	(-2.93)	(-0.87)	(-4.66)	(5.90)	(0.55)
Observations	105	102	90	102	108	103
Est. Method	FE	FE	FE	FE	FE	FE

t statistics in parentheses

Constant term and dummies for countries and 6 5-year periods included in the analysis, but not reported.

See notes to table 7.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

8.3.2 Impact of FDI and the KOF-index

International trade is only one aspect of economic openness, and although it is widely used as explanatory variable in analyses similar to the one here, it is useful to investigate other aspects of openness as well. I do this by using stock of inward FDI , *INWSTOCK*, as explanatory variable. I also utilize the KOF-index of economic globalization, as this index is meant to sum up the effects of different dimensions of openness.

Here, I exempt *SSTRAN*, *SOCX* and *PUBEXP* from the analysis and focus on my preferred volume variable *SOCPRO*.

In these regressions, the sample size decreases due to missing values of *INWSTOCK* - consequently I estimate equation 12 with both trade, inward stock of FDI and KOF-index on this smaller sample.

For *SOCPRO*, the effect of trade is insignificant in this smaller sample (column 1 in table 10). But the effect of FDI is negative and significant, and in column 4 they are both negative and significant simultaneously. The KOF-index gives a *positive* and significant effect on *SOCPRO*[20], which seems somewhat puzzling seen in the light of the results for the two other variables. When including this variable with the two others in column 4, the effect is no longer significant.

Inward stock of FDI also has a negative effect on generosity (column 2 in table 11), and the KOF-index has a positive effect for this variable too. For fiscal redistribution in table 12, there are no significant effects of openness.

For the control variables, one result that stands out is that fraction of center seats in the parliament now clearly increases generosity, whereas it decreases redistribution. The negative effect of level of GDP per capita still holds for for both *SOCPRO* and *GEN*.

I also estimate the same regression using inward FDI flows (I do not report the results) and find the coefficient for this variable is zero for all dependent variables.

The KOF-index has two aspects: actual flows and restrictions to openness, see table 13 in appendix A. To investigate the positive effect of the KOF-index more closely, I run the same regression with only the actual flows - aspect of the index (containing the variables described in the upper part of table 13) to control for any effects that are implied by the normative factors and thus would cause different results than trade/GDP (I do not report the results).

In the full sample, this empirical KOF-index is still positive and significant for *SOCPRO*, but in the smaller sample, the effect is zero on all three dependent variables. As this empirical index contains precisely data on trade, FDI and portfolio investment[21], it seems

[20]The effect of the KOF-index on *SOCPRO* is positive and significant also in the full sample.

[21]Portfolio investments are just foreign direct investments with a portfolio share too low to be defined

Table 10: SOCPRO and different openness-measures

	(1) SOCPRO	(2) SOCPRO	(3) SOCPRO	(4) SOCPRO
TRADE/GDP	-0.04			-0.12***
	(-1.32)			(-4.54)
INWSTOCK		-0.12***		-0.15***
		(-3.54)		(-5.76)
KOF-INDEX			0.11*	0.08
			(1.76)	(1.58)
POP	-0.00	-0.00	-0.00	-0.00*
	(-1.39)	(-1.36)	(-1.73)	(-2.02)
PLT15	0.00	0.00	0.00	0.00*
	(1.30)	(1.11)	(1.71)	(1.79)
PO65	0.00*	0.00	0.00**	0.00*
	(1.76)	(1.25)	(2.33)	(1.87)
UNEMP	0.00	0.00	0.00	0.00
	(0.94)	(1.30)	(1.26)	(0.82)
EGROWTH	-0.11*	-0.16**	-0.19**	-0.03
	(-2.01)	(-2.65)	(-2.33)	(-0.47)
LEFTCAB	-0.00	-0.00	0.00	0.00
	(-0.23)	(-0.03)	(0.04)	(0.24)
CNCAB	-0.00	0.00	-0.00	0.00
	(-0.19)	(0.07)	(-0.22)	(0.11)
RGDPL	-0.00**	-0.00**	-0.00**	-0.00***
	(-2.87)	(-2.68)	(-2.40)	(-4.12)
Observations	269	269	269	269
Est. Method	FE	FE	FE	FE

t statistics in parentheses
Constant term and dummies for year and country included,
but not reported.
The sample size is now to 269 observations due to
missing observations on *INWSTOCK*
.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Generosity and different openness-measures

	(1) GEN	(2) GEN	(3) GEN	(4) GEN
TRADE/GDP	0.02			-0.01
	(0.34)			(-0.17)
INWSTOCK		-0.07*		-0.06
		(-1.90)		(-1.50)
KOF-INDEX			0.12*	0.10*
			(1.89)	(1.76)
POP	-0.00*	-0.00*	-0.00*	-0.00*
	(-1.83)	(-1.84)	(-2.05)	(-2.03)
PLT15	0.00	0.00	0.00	0.00
	(1.36)	(1.44)	(1.65)	(1.69)
PO65	0.00	0.00	0.00	0.00
	(1.54)	(1.41)	(1.73)	(1.61)
UNEMP	0.00	0.00	0.00*	0.00
	(1.47)	(1.42)	(1.75)	(1.30)
EGROWTH	-0.22***	-0.19***	-0.23***	-0.21***
	(-3.05)	(-3.62)	(-4.22)	(-3.11)
LEFTCAB	0.00	0.01	0.01	0.01
	(0.87)	(1.27)	(1.17)	(1.55)
CNCAB	0.02***	0.02***	0.02***	0.02**
	(3.38)	(3.19)	(3.12)	(2.72)
RGDPL	0.00**	0.00**	0.00**	0.00**
	(2.13)	(2.37)	(2.63)	(2.52)
Observations	331	331	331	331
Est. Method	FE	FE	FE	FE

t statistics in parentheses
Constant term and dummies for year and country included,
but not reported.
The sample size is now 331 observations due to
missing observations on *INWSTOCK*
.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 12: REABS and different openness-measures

	(1) REABS	(2) REABS	(3) REABS	(4) REABS
TRADE/GDP	0.01			0.05
	(0.21)			(1.01)
INWSTOCK		0.11		0.12
		(0.93)		(1.08)
KOF-INDEX			-0.02	0.03
			(-0.18)	(0.34)
POP	0.00	0.00	0.00	0.00
	(0.75)	(0.65)	(0.88)	(0.73)
PLT15	0.00	0.00	0.00	-0.00
	(0.09)	(0.10)	(0.10)	(-0.02)
PO65	-0.00**	-0.00*	-0.00**	-0.00*
	(-2.32)	(-2.03)	(-2.14)	(-1.92)
UNEMP	0.00	0.00	0.00	0.00
	(1.21)	(1.48)	(1.19)	(1.69)
EGROWTH	-0.15	-0.15	-0.14	-0.22
	(-1.18)	(-0.95)	(-1.03)	(-1.48)
LEFTCAB	-0.00	-0.00	-0.00	-0.00
	(-0.03)	(-0.37)	(-0.06)	(-0.30)
CNCAB	-0.03***	-0.03**	-0.03***	-0.03***
	(-3.22)	(-2.82)	(-3.13)	(-2.94)
RGDPL	0.00	0.00	0.00	0.00
	(0.72)	(0.77)	(0.66)	(1.03)
Observations	322	322	322	322
Est. Method	FE	FE	FE	FE

t statistics in parentheses
Constant term and dummies for year and country included,
but not reported.
The sample size is now 322 observations due to
missing observations on *INWSTOCK*
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

inconsistent that as the effect of each of these variables separately is negative or zero, the overall effect should be positive or zero. Although an index summing up the effects of openness would be useful, for the time being I concur in the statement of Garrett and Mitchell (2001, page 156), who claim that "the best way to analyze the effects of globalization is to disaggregate the phenomenon into its different components and to compare variations not only over time but among countries as well". As international trade has different impacts across the selection of dependent variables, other aspects of openness may very well behave in the same way.

In sum, my main results are quite robust - the negative effect of openness on social expenditure clearly holds throughout this analysis, whereas the evidence for a negative effect on redistribution is somewhat weakened - but it is important to keep in mind that we in this analysis decrease the sample size by one third compared to table 8. Moreover, now there are also some signs of a negative effect of FDI on generosity.

8.3.3 Endogeneity issues

So far, I have assumed that international trade and foreign direct investment are both determined independently of welfare state generosity. The possibility that openness could be endogenous in empirical welfare state research has been very little discussed, but there are some examples[22].

If e.g. governments use openness as a political instrument and openness and welfare state generosity are set simultaneously, or if there is an omitted variable which determines both welfare state generosity and openness, then the estimate of β will be biased as

$$E(\varepsilon_{i,t}|openness_{i,t}) \neq 0$$

To deal with this issue, one could use an appropriate instrument variable for openness - see for instance Noguer and Siscart (2005), who attempt to control for endogeneity in a study of income levels by instrumenting international trade by geographical variables.

To find appropriate instrumental variables for trade is very hard. One way to mitigate potential bias is to lag the explanatory variables one period, i.e. estimate equation 12 lagging the explanatory variables in tables 10, 11 and 12. This way one avoids reverse causality.

The results of this analysis is reported in tables 15, 16 and 17 in appendix B.

as the investor will "aquire a lasting management interest" in the enterprise which is invested in (generally, this means the investor holds less than 10% of the voting stock) (The World Bank, 2003).

[22]See Adserà and Boix (2003), who have several hypotheses for why trade might be endogenous - in the light of the compensation hypothesis.

The analysis confirms the effects on *SOCPRO* - the results in tables 10 and 15 are for all practical reasons identical. However, the effects for FDI and for the KOF-index on generosity are now zero, see table 16, and for redistribution, no openness-effects are significant - the same as in table 12.

The evidence for a negative effect of openness on the institutional and redistributional aspects of welfare state generosity is thus weak. For my volume variable however, the results are quite clear: openness has a negative effect on social expenditure.

8.3.4 Omitting possibly endogenous control variables

As international trade is potentially endogenous in welfare state research, so might unemployment, economic growth and level of GDP be. As a final robustness check, I omit these control variables for from the analysis.

I estimate *SOCPRO*, *GEN* and *REABS* with the smaller set of control variables and trade as explanatory variable, to see if endogeneity of the omitted controls might affect my results - see table 14 in appendix B. As the results are almost identical to those in table 8, there is no reason to question my main results owing to endogenous control variables.

9 Concluding remarks

This thesis has analyzed the effect of economic integration, or openness, on different aspects of welfare state generosity; I have investigated three categories: social spending, redistribution and welfare state institutions.

The reason for conducting the analysis in this way was to address both the large debate on whether openness causes governments compensate citizens for risk or instead cut back on welfare benefits, and the debate on how welfare state generosity should be measured empirically. This approach enabled us to investigate how openness affects different conceptualizations of welfare states and to compare the results across the categories.

Through a critical evaluation of data and variables available, it became clear that the two welfare spending variables from OECD, which have been widely employed in similar analyses, have several shortcomings: the variable for gross social spending is too broadly defined and has too short a time span for my purpose, and the alternative, the variable for social security benefits, is unreliable. To correct for this, the variable for "public expenditure on social protection" (*SOCPRO*) from Sanz and Velázquez (2007) and Gemmell et al. (2008) was utilized as my measure of social spending.

As the measure of public expenditure on social protection follows specific social transfers over time, I believe that this variable captures welfare state generosity. The index of welfare generosity does not change much over time, and might therefore not be suitable for this type of analysis, which utilizes precisely changes in the observed countries over time. The redistribution variable, which measures changes in the Gini-index by the pre-post approach, is precisely the opposite - it is very volatile and does not follow a particular trend. However, as the simulated numbers behind this variable are new and the reliability of the data is not yet clarified, it might not be an accurate description of real changes in redistribution. Moreover, the coefficient of the pre-post variable might be biased.

The analysis clearly rejects the null hypothesis of no country - and year specific effects, so I perform the analysis by a fixed effects regression on my unbalanced data set for 18 OECD-countries in the time period 1970-2000. From the analysis it is clear that openness, measured by international trade in percentage of GDP, decreases social expenditure and fiscal redistribution. My results thus provide substance for the efficiency hypothesis. The theoretical background for the negative effect goes through the link of international tax competition, and my results are consistent with studies showing that national governments set their tax rates as a function of tax rates in neighboring countries. When governments have to compete for mobile tax bases as economic openness increases, this gives incentives to alter rates, and maintaining the initial level of welfare

state generosity becomes harder.

From the sensitivity analysis, the results for my volume variable are quite robust, and there are also some weak results that openness, in terms of foreign direct investment, decreases social entitlements, measured by an index of welfare generosity. However, at the same time, the evidence for a negative effect on redistribution is weakened.

All in all, the negative effect of increased openness is clear for social expenditure, whereas for the other two categories the evidence is not so evident. The effects of both openness and control variables are different across the three categories. If the results had been highly correlated, what concept one employed for welfare state generosity would not be a crucial issue in empirical analysis, but instead what aspect of welfare generosity clearly affects the outcome.

In conclusion, in the light of the data available and the shortcomings of different welfare variables, it will be better to conceptualize welfare state generosity by a variable like *SOCPRO*.

Although my analysis shows that the negative effect on this variable holds through several robustness checks, future research on this topic should look further into potential endogeneity problems with using welfare spending and different measures of openness in empirical analysis.

References

Adserà, A. and Boix, C. (2003). Trade, Democracy, and the Size of the Public Sector: The Political Underpinnings of Openness. *International Organization*, 56(02):229–262.

Alesina, A. and Wacziarg, R. (1998). Openness, country size and government. *Journal of Public Economics*, 69(3):305–321.

Altshuler, R. and Goodspeed, T. (2002). Follow the Leader? Evidence on European and US Tax Competition. Rutgers University Department of Economics Working Paper Series, 2002-26.

Beck, N. (2006). Time-Series-Cross-Section Methods . Available at http://politics.as.nyu.edu/docs/IO/2576/beck.pdf.

Bergh, A. (2005). On the Counterfactual Problem of Welfare State Research: How Can We Measure Redistribution? *European Sociological Review*, 21(4):345–357.

Biørn, E. (2003). *Økonometriske emner, 2. utgave*. Unipub Forlag, Oslo.

Brady, D., Beckfield, J., and Seeleib-Kaiser, M. (2005). Economic Globalization and the Welfare State in Affluent Democracies, 1975–2001. *American Sociological Review*, 70(6):921–948.

Brennan, G. and Buchanan, J. (1980). *The Power to Tax: Analytical Foundations of a Fiscal Constitution*. Cambridge University Press, Cambridge.

Bretschger, L. and Hettich, F. (2002). Globalisation, capital mobility and tax competition: theory and evidence for OECD countries. *European Journal of Political Economy*, 18(4):695–716.

Brueckner, J. and Saavedra, L. (2001). Do Local Governments Engage in Strategic Property-Tax Competition? *National Tax Journal*, 54(2):203–230.

Bucovetsky, S. (1991). Asymmetric tax competition. *Journal of Urban Economics*, 30(2):167–181.

Buettner, T. (2001). Local business taxation and competition for capital: the choice of the tax rate. *Regional Science and Urban Economics*, 31(2-3):215–245.

Carroll, E. (2000). Globalization and social policy: social insurance quality, institutions, trade exposure and deregulation in 18 OECD nations, 1965-1995'. Available at: http://www. issa. int/engl/reunion/2000/helsinki/2prog.htm.

Clasen, J. (1997). Social insurance - an outmoded concept of social protection? In Clasen, J., editor, *Social Insurance in Europe*, pages 1–13. Policy Press, Bristol.

Clasen, J. and Siegel, N. (2007). Comparative welfare state analysis and the "dependent variable problem". In Clasen, J. and Siegel, N., editors, *Investiating welfare state change - the "dependent variable problem" in comparative analysis*, pages 3–12. Edward Elgar Publishing, Celtenham.

Clasen, J. and van Oorschot, W. (2002). Changing principles in European social security. *European Journal of Social Security*, 4(2):89–115.

Cusack, T. (1997). Partisan politics and public finance: Changes in public spending in the industrialized democracies, 1955–1989. *Public Choice*, 91(3):375–395.

Devereux, M., Lockwood, B., and Redoano, M. (2008). Do countries compete over corporate tax rates? *Journal of Public Economics*, 92:1210–1235.

Dreher, A. (2006a). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics*, 38(10):1091–1110.

Dreher, A. (2006b). The influence of globalization on taxes and social policy: An empirical analysis for OECD countries. *European Journal of Political Economy*, 22(1):179–201.

Edwards, J. and Keen, M. (1996). Tax competition and Leviathan. *European Economic Review*, 40(1):113–134.

Esping-Andersen, G. (1990). *The three worlds of welfare capitalism*. Princeton University Press, Princeton NJ.

Flora, P. and Alber, J. (1981). Modernization, democratization, and the development of welfare states in western europe. In Flora, P. and Heidenheimer, A., editors, *The Development of Welfare States in Europe and America*, pages 37–80. Transaction Publishers, New Brunswick, NJ.

Flora, P. and Heidenheimer, A. (1981). The historical core and changing boundaries of the welfare state. In Flora, P. and Heidenheimer, A., editors, *The Development of Welfare States in Europe and America*, pages 17–36. Transaction Publishers.

Garrett, G. (1995). Capital Mobility, Trade, and the Domestic Politics of Economic Policy. *International Organization*, 49(4):657–87.

Garrett, G. (2001). Globalization and Government Spending around the World. *Studies in Comparative International Development (SCID)*, 35(4):3–29.

Garrett, G. and Mitchell, D. (2001). Globalization, government spending and taxation in the OECD. *European Journal of Political Research*, 39(2):145–177.

Gemmell, N., Kneller, R., and Sanz, I. (2008). Foreign investment, international trade and the size and structure of public expenditures. *European Journal of Political Economy*, 24(1):151–171.

Green-Pedersen, C. (2004). The Dependent Variable Problem within the Study of Welfare State Retrenchment: Defining the Problem and Looking for Solutions. *Journal of Comparative Policy Analysis: Research and Practice*, 6(1):3–14.

Green-Pedersen, C. (2007). More than data questions and methodological issues: theoretical conceptualization and the dependent variable "problem" in the study of welfare reform. In Clasen, J. and Siegel, N., editors, *Investigating welfare state change - the "dependent variable problem" in comparative analysis*, pages 13–22. Edward Elgar Publishing, Celtenham.

Greene, W. H. (2003). *Econometric Analyses(5th edition)*. Prentice Hall, New Jersey.

Hicks, A. and Swank, D. (1992). Political Institutions and Welfare Spending in Industralized Countries, 1960-82. *American Political Science Review*, 86(3):658–674.

Huber, E., Ragin, C., and Stephens, J. (1993). Social Democracy, Christian Democracy, Constitutional Structure, and the Welfare State. *American Journal of Sociology*, 99(3):711–749.

Iversen, T. (2001). The Dynamics of Welfare State Expansion: Trade Openness, Deindustrialization, and Partisan Politics. In Pierson, P., editor, *The New Politics of the Welfare State*, pages 45–79. Oxford University Press, Oxford.

Kennedy, P. (2003). *A Guide to Econometrics (5th edition)*. Blackwell Publishing, Oxford and Malden, MA.

Kessler, A., Lulfesmann, C., and Myers, G. (2002). Redistribution, Fiscal Competition, and the Politics of Economic Integration. *The Review of Economic Studies*, 69(4):899–923.

Korpi, W. and Palme, J. (1998). The Paradox of Redistribution and Strategies of Equality: Welfare State Institutions, Inequality, and Poverty in the Western Countries. *American Sociological Review*, 63(5):661–687.

Korpi, W. and Palme, J. (2003). New Politics and Class Politics in the Context of Austerity and Globalization: Welfare State Regress in 18 Countries, 1975–95. *American Political Science Review*, 97(03):425–446.

Korpi, W. and Palme, J. (2007). The Social Citizenship Indicator Program (SCIP), Swedish Institute for Social Research, Stockholm University. Available at https://dspace.it.su.se/dspace/handle/10102/7.

Koster, F. (2008). The welfare state and globalisation: down and out or too tough to die? *International Journal of Social Welfare*, (doi: 10.1111/j.1468-2397.2008.00571.x).

Krugman, P. (2000). Technology, trade and factor prices. *Journal of International Economics*, 50(1):51–71.

Krugman, P. (2008). Trade and Wages, Reconsidered. Conference Draft for the spring meeting of the Brookings Panel of Economic Activity.

Lindbom, A. (2001). Dismantling the Social Democratic Welfare Model? Has the Swedish Welfare State Lost Its Defining Characteristics? *Scandinavian Political Studies*, 24(3):171–193.

LIS (2004). Comparative welfare dataset. Available at http://www.lisproject.org/publications/welfaredata/welfareaccess.htm.

LIS (2008). Fiscal redistribution dataset. Available at http://www.lisproject.org/publications/fiscalredistdata/fiscred.htm.

Mahler, V. (2004). Economic Globalization, Domestic Politics, and Income Inequality in the Developed Countries: A Cross-National Study. *Comparative Political Studies*, 37(9):1025–1053.

Mahler, V. and Jesuit, D. (2004). State Redistribution in Comparative Perspective: A Cross-National Analysis of the Developed Countries. Luxembourg Income Study Working Paper Series, Working Paper no 392.

Mahler, V. and Jesuit, D. (2006). Fiscal redistribution in the developed countries: new insights from the Luxembourg Income Study. *Socio-Economic Review*, 4(3):483–511.

Mendoza, E., Razin, F., and Tesar, L. (1994). Effective tax rates in macroeconomics. Cross-country estimates of tax rates on factor incomes and consumption. *Journal of Monetary Economics*, 34:297–323.

Montanari, I. (2001). Modernization, globalization and the welfare state: a comparative analysis of old and new convergence of social insurance since 1930. *The British Journal of Sociology*, 52(3):469–494.

Noguer, M. and Siscart, M. (2005). Trade raises income: a precise and robust result. *Journal of International Economics*, 65(2):447–460.

Oates, W. (1972). *Fiscal Federalism*. Harcourt, New York.

OECD (1999). OECD Benchmark Definition of Foreign Direct Investment. Available at http://www.oecd.org/dataoecd/10/16/2090148.pdf.

OECD (2007). Social Expenditure Database.

Pettersson-Lidbom, P. (2006). Do parties matter for economic outcomes? A regression-discountinuity approach. Available at SSRN:http://ssrn.com/abstract=988343.

Pierson, P. (1996). The New Politics of the Welfare State. *World Politics*, 48:143–179.

Quinn, D. (1997). The Correlates of Change in International Financial Regulation. *American Political Science Review*, 91(3):531–551.

Ram, R. (2008). Openness, Country Size, and Government Size: Additional Evidence from a Large Cross-Country Panel. *Journal of Public Economics*, doi: 10.1016/jpubeco.2008.04.009.

Redoano, M. (2003). Fiscal Interactions Among European Countries. Warwick Economic Research Papers No 680.

Revelli, F. (2001). Spatial patterns in local taxation: tax mimicking or error mimicking? *Applied Economics*, 33(9):1101–1107.

Revelli, F. (2005). On Spatial Public Finance Empirics. *International Tax and Public Finance*, 12(4):475–492.

Rodrik, D. (1997). *Has Globalization Gone Too Far?* Institute for International Economics, Washington D.C.

Rodrik, D. (1998). Why do More Open Economies Have Bigger Governments? *Journal of Political Economy*, 106(5):997–1032.

Samuelson, P. A. (1954). Pure Theory of Public Expenditure. *The Review of Economics and Statistics*, 36(4):387–389.

Sanz, I. and Velázquez, F. (2007). The role of ageing in the growth of government and social welfare spending in the OECD. *European Journal of Political Economy*, 23(4):917–931.

Scruggs, L. (2004). Welfare State Entitlements Data Set: A Comparative Institutional Analysis of Eighteen Welfare States, Version 1.1. Available at http://sp.uconn.edu/ scruggs/wp.htm.

Scruggs, L. and Allan, J. (2006). Welfare State Decommodification in Eighteen OECD Countries: A Replication and Revision. *Journal of European Social Policy*, 16(1):55–72.

Shcuknecht, L. and Tanzi, V. (2005). Reforming public expenditure in industrialised countries. are there trade-offs? European Central Bank, Working Paper no 435.

Shlens, J. (2005). A tutorial on principal components analysis. Available at http://www.snl.salk.edu/ shlens/pub/notes/pca.pdf.

Siegel, N. A. (2007). When (only) money matters: the pros and cons of expenditure analysis. In Clasen, J. and Siegel, N. A., editors, *Investigating welfare state change - the "Dependent Variable Problem" in comparative analysis*, pages 43–71. Edward Elgar Publishing, Celtenham.

Sinn, H. (1994). How much Europe? Subsidiarity, centralization and fiscal competition. *Scottish Journal of Political Economy*, 41(1):85–107.

Sinn, H. (2003). *The New Systems Competition*. Blackwell Publishing, Oxford and Malden, MA.

Solt, F. (2008). Standardizing the World Income Inequality Database. *Forthcoming: Social Science Quarterly*.

Stolper, W. and Samuelson, P. (1941). Protection and Real Wages. *Review of Economic Studies*, 9(1):58–73.

Swank, D. (2005). Globalisation, Domestic Politics, and Welfare State Retrenchment in Capitalist Democracies. *Social Policy and Society*, 4(02):183–195.

Swank, D. and Steinmo, S. (2002). The New Political Economy of Taxation in Advanced Capitalist Democracies. *American Journal of Political Science*, 46(3):642–655.

The World Bank (2003). Global financial flows, world development indicators 2003. Available at http://www1.worldbank.org/economicpolicy/globalization/documents/table6-7.pdf.

Titmuss, R. (1958). *Essays on "The Welfare State"*. Allen and Undwin, London.

UN (2000). Statistical Papers, Series M No 84. Department of Economic and Social Affairs, Statistics Division.

Wilson, J. (1986). A Theory of Interregional Tax Competition. *Journal of Urban Economics*, 19(3):296–315.

Wilson, J. and Wildasin, D. (2004). Capital tax competition: bane or boon. *Journal of Public Economics*, 88(6):1065–1091.

Zodrow, G. and Mieszkowski, P. (1986). Pigou, Tiebout, Property Taxation, and the Underprovision of Local Public Goods. *Journal of Urban Economics*, 19(3):356–370.

Appendices

A Details of the KOF-index

This index includes both actual flows (trade, FDI, portfolio investments) as well as normative restrictions (capital account restrictions, trade barriers). The index taxes a value between 0 and 100. Each variable is transformed to an index with a 0-10 scale, where higher value means higher openness. Detailed information on the variables used and the weighting is found in table 13 (Dreher, 2006a).

The weighting is done by principal components analysis, which is a way to identify patterns, or variance, in the data by a vector space transform. The goal of this transform is to create a *basis* which filters out the noise in the dataset and reveals the hidden structure (Shlens, 2005). Here, the year 2000 is chosen as the base year. For this year, the variance of the variables used is partitioned, and the weights each component of the index should have are determined in a way that maximizes the variance of the resulting principal component (Dreher, 2006a).

Table 13: KOF-index of economic globalization

Type of variable	Variable	Weight
Actual Flows:		50%
	Trade (percent of GDP)	18%
	FDI flows (percent of GDP)	21%
	FDI stock (percent of GDP)	22%
	Portfolio Investment (percent of GDP)	19%
	Income Payments to Foreign Nationals (percent of GDP)	20%
Restrictions:		50%
	Hidden Import Barriers	24%
	Mean Tariff Rate	28%
	Taxes on International Trade (percent of current revenue)	27%
	Capital Account Restrictions	20%

B Regressions from sensitivity analyses

Table 14: Omitting possibly endogenous control variables

	(1) SOCPRO	(2) GEN	(3) REABS
TRADE/GDP	-0.08***	0.02	-0.11**
	(-3.94)	(0.41)	(-2.35)
POP	-0.00	-0.00**	0.00
	(-1.21)	(-2.86)	(1.55)
PLT15	0.00	0.00	-0.00
	(1.16)	(1.71)	(-0.54)
PO65	0.00	0.00***	-0.00**
	(0.61)	(2.91)	(-2.35)
LEFTCAB	-0.00	0.00	-0.00
	(-0.41)	(0.74)	(-0.28)
CNCAB	0.00	0.01	-0.01
	(0.07)	(1.38)	(-1.51)
Observations	480	538	487
Est. Method	FE	FE	FE

t statistics in parentheses
Constant term and dummies for year and country included,
but not reported.
See notes to table 7.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 15: SOCPRO - lagged explanatory variables

	(1) SOCPRO	(2) SOCPRO	(3) SOCPRO	(4) SOCPRO
L1TRADEGDP	-0.06			-0.13***
	(-1.57)			(-3.62)
L1INWSTOCK		-0.11***		-0.14***
		(-3.20)		(-4.29)
L1KOFINDEX			0.10*	0.09*
			(1.83)	(1.88)
POP	-0.00	-0.00	-0.00	-0.00*
	(-1.47)	(-1.25)	(-1.65)	(-1.99)
PLT15	0.00	0.00	0.00	0.00*
	(1.42)	(1.02)	(1.62)	(1.86)
PO65	0.00*	0.00	0.00*	0.00
	(1.79)	(1.12)	(2.11)	(1.73)
UNEMP	0.00	0.00	0.00	0.00
	(0.86)	(1.47)	(1.17)	(0.70)
EGROWTH	-0.08	-0.16**	-0.16**	-0.05
	(-1.44)	(-2.92)	(-2.28)	(-0.90)
LEFTCAB	-0.00	0.00	0.00	0.00
	(-0.17)	(0.02)	(0.07)	(0.57)
CNCAB	-0.00	-0.00	-0.00	0.00
	(-0.30)	(-0.10)	(-0.34)	(0.08)
RGDPL	-0.00**	-0.00**	-0.00**	-0.00***
	(-2.78)	(-2.44)	(-2.49)	(-3.45)
Observations	255	255	255	255
Est. Method	FE	FE	FE	FE

t statistics in parentheses
The sample size is now 269 due to missing observations on *INWSTOCK*.
See notes to table 10
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 16: Generosity - lagged explanatory variables

	(1) GEN	(2) GEN	(3) GEN	(4) GEN
L1TRADEGDP	0.00			-0.03
	(0.04)			(-0.70)
L1INWSTOCK		-0.07		-0.07
		(-1.70)		(-1.47)
L1KOFINDEX			0.09	0.07
			(1.31)	(1.17)
POP	-0.00	-0.00	-0.00*	-0.00*
	(-1.73)	(-1.68)	(-1.83)	(-1.90)
PLT15	0.00	0.00	0.00	0.00
	(1.30)	(1.32)	(1.48)	(1.60)
PO65	0.00	0.00	0.00	0.00
	(1.45)	(1.25)	(1.56)	(1.45)
UNEMP	0.00	0.00	0.00	0.00
	(1.52)	(1.57)	(1.74)	(1.21)
EGROWTH	-0.18**	-0.18**	-0.20***	-0.17**
	(-2.13)	(-2.82)	(-3.31)	(-2.24)
LEFTCAB	0.00	0.01	0.01	0.01
	(0.78)	(1.32)	(1.10)	(1.58)
CNCAB	0.01***	0.02***	0.02***	0.02**
	(3.09)	(3.05)	(2.98)	(2.84)
RGDPL	0.00*	0.00**	0.00**	0.00**
	(2.12)	(2.34)	(2.39)	(2.32)
Observations	316	316	316	316
Est. Method	FE	FE	FE	FE

t statistics in parentheses
The sample size is now 331 due to missing observations on *INWSTOCK*.
See notes to table 10
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 17: Fiscal redistribution - lagged explanatory variables

	(1) REABS	(2) REABS	(3) REABS	(4) REABS
L1TRADEGDP	-0.04			0.01
	(-0.47)			(0.22)
L1INWSTOCK		0.12		0.13
		(0.91)		(0.99)
L1KOFINDEX			0.01	0.05
			(0.10)	(0.57)
POP	0.00	0.00	0.00	0.00
	(0.42)	(0.49)	(0.74)	(0.42)
PLT15	0.00	0.00	0.00	0.00
	(0.37)	(0.32)	(0.35)	(0.35)
PO65	-0.00**	-0.00*	-0.00**	-0.00
	(-2.21)	(-1.93)	(-2.18)	(-1.74)
UNEMP	0.00	0.00	0.00	0.00
	(0.89)	(1.34)	(1.00)	(1.45)
EGROWTH	-0.08	-0.10	-0.12	-0.13
	(-0.73)	(-0.68)	(-0.80)	(-1.09)
LEFTCAB	-0.00	-0.00	-0.00	-0.00
	(-0.07)	(-0.49)	(-0.04)	(-0.44)
CNCAB	-0.03***	-0.03***	-0.03***	-0.03***
	(-4.14)	(-2.96)	(-3.96)	(-3.35)
RGDPL	0.00	0.00	0.00	0.00
	(0.57)	(0.71)	(0.59)	(0.79)
Observations	309	309	309	309
Est. Method	FE	FE	FE	FE

t statistics in parentheses
The sample size is now 322 due to missing observations on *INWSTOCK*.
See notes to table 10
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$